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TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

PUBLIC HEALTH BULLETIN No. 113
MAY, 1921

A REVIEW OF PUBLIC HEALTH ADMINISTRATION IN MEMPHIS, TENNESSEE

BASED UPON A SURVEY OF HEALTH ACTIVITIES AND SANITARY CONDITIONS IN MAY, 1920, AND

RECOMMENDATIONS FOR REORGANIZATION OF HEALTH DEPARTMENT

BY

PAUL PREBLE
Passed Assistant Surgeon, United States Public Health Service

PREPARED BY DIRECTION OF THE SURGEON GENERAL

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A REVIEW OF PUBLIC HEALTH ADMINISTRATION IN MEMPHIS, TENNESSEE.[1]

INTRODUCTION.

The present mayor and commissioners of the city of Memphis were elected upon a "citizen's ticket" and took oath of office January 1, 1920. Provisions of an "ouster" law had permitted frequent changes in the city's administration in recent years and politics had admittedly dominated the affairs of local government, including the public health administration.

Realizing the important functions devolving upon a municipal department of health in a city the size of Memphis and recognizing the need for a careful survey and study of existing conditions and the present machinery operating as the city health department before attempting any plan of reorganization, the present mayor, through the secretary of the State board of health for Tennessee, requested the Surgeon General of the United States Public Health Service to detail an officer for this purpose. Early in his administration the mayor had visited a number of other cities and conferred personally with eminent health authorities associated with several of the well-known institutions where progressive work in public health administration has been undertaken.

Following a conference with the secretary of the State board of health at Nashville, the present survey was commenced on March 30, 1920, and continued until April 19, 1920. It has consisted of a study of organization, activities, and needs, not of individuals.

ACKNOWLEDGMENTS.

It is desired here to acknowledge the valuable assistance and real cooperation received during the period of the survey and the many courtesies shown, particularly by the mayor, the superintendent of health, and other personnel in various departments, in granting free access to all available records and in supplying personal information, opinions, and criticisms, without which the survey would have been incomplete. Acknowledgment is likewise made for the invaluable

[1] Editorial note: Since this survey was made, the efficiency of the health department in Memphis has been increased by the reorganization of the work as suggested in the review here published. A full-time superintendent of health has been appointed. Memphis has made splendid progress in improving its health conditions, and now bids fair to have one of the most progressive health departments in any city of its size.

help and suggestions given by many physicians and others too numerous to mention, but whose interest in the future development of public health activities indicates that the need for a progressive health administration is fully recognized, and to Sanitary Engineer J. K. Hoskins for the preparation of the charts used in this report.

THE CITY OF MEMPHIS.

The city of Memphis is located in the southwestern corner of Tennessee, on the eastern bank of the Mississippi River. It is the largest city in the State, the present population, according to the 1920 census, being 162,351. It was the fourth city of the South in 1910, with a population of 131,105, Birmingham, Atlanta, and New Orleans ranking it in size. In 1910, approximately 40 per cent of the population was colored, and the census of that year showed 26,710 dwellings and a total of 31,154 families. The recent enumeration indicates a normal healthy growth during the past 10 years. Territorial annexations on December 1, 1919, added a population of 11,587. The total land area is about 22 square miles, slightly rolling, with natural drainage to the river and numerous bayous.

Memphis is an important metropolitan city with extensive commercial interests, its present assessed valuation being given at about $200,000,000. It is an important railroad and trading center and is said to be rated as the largest inland hardwood lumber market in the world. It has an extensive market for raw cotton and its various products.

PUBLIC HEALTH ADMINISTRATION IN TENNESSEE.

In order to study in any detail the operation of the local health administration, it seemed desirable to review existing State and local laws, ordinances, and regulations pertaining thereto. The various State and local enactments had not been codified and it therefore became necessary to have them assembled rather laboriously from several sources. Practically all of the procedures and activities of the city health department are based upon local municipal ordinances, provisions of the city charter, and State laws.

State Board of Health.

The Tennessee State Board of Health consists of three physicians appointed by the governor, each member being a regular graduate of medicine, engaged in practice not less than 10 years, one to be selected from each grand division of the State. The State commissioner of agriculture is ex officio a member of the board. The term of office for membership is six years, one new member being appointed every

two years. They receive no "per diem" except when epidemic diseases appear in the State.

The secretary of this board is elected by said board for a term of five years, and he is the executive officer with offices at Nashville.

The powers and duties of the State board are set forth in the appendix.

Local Boards of Health.

Under the authority of the acts of 1909 the State legislature makes the following provisions for local boards of health:

Sec. 3101. Every municipality having 5,000 inhabitants or over shall organize a properly constituted board of health, which, in addition to duties as such local boards, shall also make monthly, quarterly, semiannual, and annual reports to and in accordance wtih such form and instructions as said State board of health may prescribe, and also shall make special reports whenever requested.

Sec. 3102. Boards of health established in various cities and towns of the State shall have the same jurisdiction and authority to do all acts in territory extending 1 mile from the corporation, in any direction, that they have within the corporation. * * *

In the case of Ballentine *v.* Polaski (15 Lea, 644, 645) it was declared that the State, county, or cities may be required by statute, at their own respective expense, to take measures to prevent the spread of disease.

HISTORY OF HEALTH ADMINISTRATION IN MEMPHIS.

The history of the municipal government of the city of Memphis is interesting and rather complex. The original charter of 1826 was repealed because of inability to meet the indebtedness arising from the yellow-fever epidemic of 1878. The debt was compromised by the taxing district act of 1879 and subsequent amendatory acts of the State legislature, the local government being resolved back into the body of the State, all offices abolished, and the power of local taxation withdrawn. In 1891 the name "the city of Memphis" was restored and in 1903 the city was again permitted to levy and collect certain taxes. In 1909 the taxing district act was again amended to provide for a commission form of local government and a reorganization of the several municipal functions.

The Original Board of Health.

A "board of health" was created by the taxing district act of 1879, to consist of the "chief of police, a health officer, and one physician, who shall be ex officio president of the board." The local government was empowered to pass all laws necessary for the preservation of health, as indicated in the appendix.

City ordinances passed prior to 1909 also provided for the establishment of a "board of health," to be composed of the "chief of

police; one physician, who shall have practiced his profession for not less than five years prior to his appointment; a secretary, who shall be a physician in good standing; and one policeman."

Certain officers of the city were also required to take oath of office and to execute bonds for the faithful performance of their duties, as follows: One meat inspector, $5,000; one food inspector, $500; superintendent of the city hospital, $5,000.

Duties of Board of Health Required by Ordinances.

The president (provided for under the act of 1879) was required to preside at all meetings of the board, to "see that all health regulations are properly executed" and to make an annual report to the city council.

The health officer (also provided for in the act of 1879, but not specifically designated as such in the ordinances) was required to carry out all the orders of the board, the State laws, and city ordinances. His detailed duties will be found in the appendix.

The secretary was a physician selected by the president, and he apparently was a member of the board. It was his duty to keep all records, books, and papers, to prepare and collect vital statistics, and to make monthly reports to the council. It was also his duty to "visit and attend the sick prisoners in the hands of the city." Under the charge of the secretary, the city was required to maintain a dispensary and provide medicines for indigent persons.

The ordinances pertaining to health and sanitary regulation of the city are quite extensive and detailed and an abstract of the more important requirements will be found in the appendix. Prior to 1909, pure food regulations had been adopted and many ordinances passed governing water-closets and privies and the disposal of night soil.

Early ordinances required the notification of communicable diseases by physicians and others and the registration of births, deaths, and marriages.

Board of Health Abolished.

The board of health for the city of Memphis, originally provided by the taxing district act, was abolished by the act of 1909 (Senate bill 574, ch. 298) amending the city charter as follows:

Sec. 5. That the board of health (of the city of Memphis) as at present constituted is hereby abolished and in lieu thereof is established a subordinate department to be known as the health department, to be under the supervision and control of the department of public affairs, which said department shall perform the duties and functions heretofore performed by the board of health.

HEALTH DEPARTMENT ESTABLISHED, 1909.

By this act of 1909 there was created a board of commissioners of the city of Memphis, composed of five commissioners, one of whom is the mayor, who serves as commissioner of public affairs and health. There was also organized the departments of fire and police; streets, bridges, and sewers; accounts, finances, and revenues; and public utilities, grounds, and buildings.

The mayor is elected for a term of four years, at a salary of $6,000, and by virtue of his office is commissioner of health and is given "general supervision over the office of superintendent of health and matters relating thereto, including the city hospital, the veterinary surgeon, and all matters properly pertaining to said department."

This act further provides that the board of commissioners shall, among other appointments, include the following with specified terms of office and salaries:

Superintendent of health, 2 years	$3,000
City chemist, 1 year	2,400
City meat inspector, 1 year	1,500
Superintendent of city hospital, 1 year	1,500

No appointive officer or employee of the city is permitted by law to accept any moneys or gifts of any character whatever other than that stipulated for his office, nor may he accept any other office under the city or become an officer or employee (with or without pay) of the State or county in any capacity.

By this law it appears that the appointment, term of office, and salary of the superintendent of health is fixed, although the validity of this law has been questioned.

The department of streets, bridges, and sewers embraces the engineering department, the office of plumbing inspector, street cleaning, and recently took over from the health department the collection of garbage, night soil, and other refuse.

A civil-service commission was provided, to consist of three members, appointed by the commissioners. This commission, under such rules and regulations as may be prescribed by the commissioners, is required to hold examinations to determine the fitness of applicants for positions in the city government. All vacancies that come under civil-service rule are required to be filled by selection from the eligible lists submitted to the city commissioners. Provision is made for temporary appointments, not to exceed 30 days, when the eligible list is reduced to less than three names. The superintendent of health may peremptorily suspend or discharge any subordinate under his direction for neglect of duty or disobedience of orders, such action, with reasons therefor, to be reported in writing to the commissioner of health, who will affirm or revoke such suspension or discharge.

Organization of present city health department.

[Department of public affairs and health; commissioner of health (mayor).]

HEALTH DEPARTMENT.

	Per annum.
Administration:	
Superintendent of health (part time)	[1]$3,000
Secretary (part time)	1,800
Clerk (full time), office	1,200
Maid (full time), colored	600
Division of communicable diseases:	
Clerk (full time)	1,200
Contagious disease inspector (full time)	[1]1,650
Tuberculosis investigator (full time)	[1]1,200
Division of school inspection:	
Supervisor of nurses (full time)	[1]1,440
13 school nurses, white (full time), each	[1]1,200
4 school nurses, colored (full time), each	[1]840
Chemical and bacteriological division (food and milk control):	
City chemist (full time), in charge	2,400
Technician (full time)	1,200
Clerk (full time), salary from special fund	900
Maid (full time), colored	480
3 food inspectors (full time), each	[1]1,200
Dairy inspector (part time)	[1]1,200
Milk inspector (full time)	[1]1,200
Meat inspector (full time)	[1]1,500
Do	[1]1,200
Division of sanitary inspection:	
Chief sanitary inspector (full time)	[1]1,440
15 sanitary inspectors (full time), each	1,200
Miscellaneous:	
Health officer (full time)	[1]1,800
Antinarcotic clinic, physician (part time)	900
Venereal disease clinic, physician (part time)	720
Fresh-air school, physician (part time)	720

Transportation.

The secretary, health officer, contagious disease inspector, tuberculosis investigator, and chief sanitary inspector are allowed gasoline, oil, and repairs to their own private automobiles. The dairy and milk inspectors and one sanitary officer are each furnished a Ford roadster with the necessary gasoline, oil, and repairs. One meat inspector is provided with a horse and buggy and an allowance of $15 per month for feed. The other meat inspector is given an allowance of $3 per month for street car fare. The 3 food inspectors and 18 nurses are allowed necessary fares on street cars.

The exact cost for automobile upkeep, including gasoline, oil, and repairs to the cars mentioned in the above paragraph could not be determined, but apparently these items for the calendar year 1919

[1] Transportation allowance not included.

amounted to about $4,350 for nine cars, three of which are owned by the city. In addition, about $879 was expended for street car fares and horseshoeing. An item of approximately $5,246 for transportation expenses seems excessive, and an investigation of these expenditures is under way.

Financial report, 1919.

	Expended, 1919.	Estimates, 1920.
Administrative division:		
Salaries	$7,150.00	$8,000.00
Supplies	828.99	828.00
Ice	133.78	135.00
Reports, monthly and annual	314.25	480.00
Telegrams	8.85	25.00
Long-distance telephone	.70	1.00
Auto repairs and supplies	206.32	205.00
Engineering department (auto repairs)	403.24	402.00
Miscellaneous	12.28	13.00
	9,058.41	10,089.00
Chemical and bacteriological department:		
Salaries	11,437.50	11,440.00
Drugs	672.58	672.00
Ice	86.00	86.00
Gas	43.76	43.00
Auto repairs and supplies	829.55	825.00
Engineering department (auto repairs)	1,157.88	1,156.00
Street car fares	120.75	125.00
Horse shoeing and feed	214.00	214.00
Miscellaneous	143.32	145.00
	14,705.34	14,706.00
Meat inspector:		
Salary	1,500.00	1,500.00
Supplies	15.50	40.00
Car fares	36.00	36.00
	1,551.50	1,576.00
Sanitary department:		
Salaries	16,568.12	19,440.00
Supplies	100.95	101.00
Auto repairs and supplies	154.67	157.00
Engineering department (auto repairs)	286.78	186.00
	17,110.52	19,884.00
Dispensary:		
Salaries	3,659.00	6,240.00
Telephone	121.09	120.00
Dispensary—Continued.		
Drugs	$4.25	$5.00
Laundry	.31	4.00
Gasoline	187.50	300.00
	3,972.15	6,669.00
Visiting nurses:		
Salaries	16,471.26	20,400.00
Car fares	689.99	890.00
Associated charities	5,000.00	5,000.00
Public Health Nursing Association	3,947.59	6,500.00
	26,108.84	32,790.00
Contagious disease department:		
Salaries	1,600.00	1,650.00
Meningitis serum	4.50	5.00
Pasteur treatment	929.40	1,000.00
Diphtheria antitoxin	258.86	260.00
Drugs	133.48	130.00
Vaccine	450.29	450.00
Formaldehyde	1,366.69	1,500.00
Supplies	568.86	568.00
Tetanus serum	31.54	30.00
Typhoid fever vaccine	1,410.70	1,000.00
Ambulance	337.00	350.00
Auto repairs and supplies	404.53	313.00
Engineering department (auto repairs)	378.05	378.00
Board for tubercular patients	42.90	.....
Laundry	1.05	1.00
	7,917.85	7,635.00
Mosquito campaign:		
Salaries	5,113.34	.....
Hardware	79.65	.....
Oats	54.00	.....
Supplies	66.09	.....
Oil	454.51	.....
Kerosene	39.88	.....
Auto repairs and supplies	115.27	.....
Engineering department (auto repairs)	358.06	.....
	6,280.80	.....

SUMMARY, 1919.

	Salaries.	Expenses.	Total.
Administration division	$7,150.00	$1,908.41	$9,058.41
Chemical and bacteriologieal division	11,437.50	3,267.84	14,705.34
Meat inspection	1,500.00	51.50	1,551.50
Sanitary department	16,568.12	542.40	17,110.52
Dispensary	3,659.00	313.15	3,972.15
Visiting nurses	16,471.26	9,637.58	26,108.84
Contagious disease department	1,600.00	6,317.85	7,917.85
Mosquito campaign	5,113.34	1,167.46	6,280.80
Total	63,499.22	23,206.19	86,705.41

RECEIPTS, 1919.

Chemical and bacteriological department, tuberculin tests	$17.50
Administrative division, midwife examinations	35.00
Sanitary department, damage to car from street railway company	30.00
Mosquito campaign, sale empty grease barrels	7.00
Contagious disease division:	
Sale empty formaldehyde barrels	37.50
Pasteur treatments	232.20
Total receipts	359.20

In 1918 the total expenditures for the health department and garbage collection amounted to $186,743.61, and of this $115,698.15 was credited to the cost of garbage collection, leaving a balance of $71,045.46 for the maintenance of the health department. The expenditures of this department for 1919 were therefore increased by $15,659.95.

It is difficult to analyze these expenditures for health activities, as will be indicated later, and to correlate them with results accomplished. The total expenditure for 1919 represents approximately 55 cents per capita and should permit a reasonably adequate organization.

Financial Aid to Nonofficial Agencies.

An allotment or grant of $5,000 is made each year to the associated charities organization and about $600 each month to the Public Health Nursing Association, apparently releasing the city from any further obligation of caring for the indigent sick and needy. The city has no voice or control over the expenditure of these grants and no supervision over the health activities of these organizations.

As a link between the city hospital and the associated charities a medical social service is being developed to provide for the indigent cases after discharge from the hospital. This service will tie up discharged cases with the out-patient department of the university. In this connection cases are sometimes referred to the Public Health Nursing Association.

While provision for aid to indigent sick is a function of the city, the health department is concerned only with communicable infections. There should, however, be harmonious cooperation between the several agencies concerned in the care of the indigent sick, and if the grants previously mentioned continue to be made and are charged against the expenditures of the health department, a definite program should be developed and the activities of these private organizations should be placed at the disposal of the health department to the extent that they are concerned with purely public health problems.

Office and Records.

The offices of the city health department are located in the basement floor of the county building, near the center of the city. One

large room about 50 by 60 feet is divided by means of false partitions into six small rooms, one of which serves as a waiting room. The office clerk occupies one outside room, the communicable disease clerk and the nurses another. The small central outside room is a general office for use of sanitary inspectors and others. One inside room with no natural lighting contains the desk of the chief sanitary inspector and serves as a general office for the "health officer" for purposes of vaccinations, examinations, etc. The other inside room was formerly used as an office for the registrar of vital statistics, but at the present time largely as a storage room. The office of the superintendent of health is a very small room located in a corridor connecting with the clerk's office.

The laboratory occupies two fair-sized adjoining rooms and is fairly well equipped for the work undertaken.

There is practically no library for reference purposes. The records of births and deaths are kept in two unprotected cabinets in the general office with the exception of more recent unbound certificates which are filed in a portable wooden closet. All records of communicable diseases reported and visited and the reports of the nurses are filed in the room used by the communicable disease clerk. At the end of each calendar year and after the material has been assembled for the annual report, some of the records are stored in the basement. There is one typewriter, a small multigraph machine, and a refrigerator for storing vaccines, antitoxins, etc.

The offices are open week days from 8 a. m. until 5 p. m., except on Saturdays when they close at noon. There is no one on duty in the offices on Sundays and holdiays except occasionally in the laboratory for such necessary work as may be required. The sanitary inspectors report at the office at 8 a. m. for any special instructions and then proceed to their districts. The nurses arrive at the schools at 9 a. m.

The present offices are cramped and inadequately equipped. It is planned to move the entire department to the new city auditorium, which, it is understood, will be completed in about 18 months.

ACTIVITIES OF HEALTH DEPARTMENT.

The health activities of the city of Memphis have been administered under the direction of a part-time executive, designated since 1909 as the superintendent of health and appointed by the mayor for a specified term of two years at a fixed salary of $3,000 per annum.

A review of city ordinances adopted for the preservation of health and the regulation of sanitation would seem to indicate that the importance of such functions had been recognized early, fairly

comprehensive measures appearing in the act of 1879, creating the taxing district. The yellow fever epidemic in the seventies undoubtedly served to direct attention to the urgent need for proper sanitary laws. A sewerage system was started in 1879, and over 70 miles of mains had been laid prior to the close of 1898. In 1903 the city purchased its water supply system, there being at this time 17,213 connections with an average daily consumption of approximately 13,000,000 gallons.

The health department early inherited supervision over the collection and disposal of garbage and refuse and the alley cleaning department was added to its functions in 1910. In that year street cleaning was transferred to the engineering department and early in 1920 garbage collection and disposal and the alley cleaning department (for the collection and disposal of night soil) was given over to the department of streets, bridges, and sewers where it more properly belongs.

The relative or assumed importance of sanitary inspection is indicated by the early development of a division of sanitary inspection. In 1898 a force of 4 inspectors had been increased to 13. This division has been continued up to the present time. Until 1898 it had been placed in charge of a physician in part-time service.

A chemical and bacteriological laboratory was also established about 1898, in charge of a city chemist, and a city hospital was erected in about the same year with a city dispensary operating in the central police station for first aid and emergency medical and surgical treatment.

School inspection was first inaugurated in 1908 with one part-time physician. In 1910 this division had been increased to 13 physicians, all part-time, and in the following year 4 more physicians and 4 nurses were added. This large medical personnel was discontinued in 1916, since which time the work at the schools has been carried on by a force of 18 nurses and one part-time physician whose services were discontinued March 1, 1920.

From such data and information as it has been possible to assemble during the present survey, it would appear that the expansion of public health activities in Memphis has been influenced to a considerable degree by political conditions. Many of the personnel "put on the pay roll" of the health department have received their appointments rather because of certain political considerations and not because of their special experience and training or other qualifications that might be adaptable to public health work.

With these past conditions in mind, it is not difficult to visualize the status and efficiency of the organization and its activities up to the present time. It would be more difficult to express in terms of sick-

ness prevented and lives saved the real value of such an organization, although published annual reports may indicate statistically a considerable activity along certain lines.

It is believed that, in addition to the retarding influence of political indifference to the important functions that should be carried on by a city health department, perhaps the real reason for the lack of further progress is the fact that the administration of health affairs has been delegated to part-time, busy practicing physicians, who, even though competent or desirous of promoting the health interests of the city, have been seriously handicapped not only by personal obligations extraneous to municipal service but by the complexion of the personnel placed under their direction. Rather frequent changes in the position of chief executive, part-time service, friction, and lack of interest and ability on the part of subordinate personnel have all mitigated against the adoption of a more progressive plan of action. These criticisms are directed to the system and are not intended as reflections upon individuals.

In attempting a review of the present organization and activities of the health department, the following presentation has been based upon personal interviews with nearly all of the present personnel and, in addition, with many physicians and others especially interested in and having personal knowledge of local conditions and needs, and also upon a careful study and digest of published reports and such records and data as were found available.

I. Administration.

Superintendent of health.

The position of superintendent of health was created apparently de novo by the act of 1909, the appointment to be made by the board of city commissioners. The present incumbent has served in this position since 1915 with the exception of a short absence on military duty. He had previously served as chief sanitary inspector from about 1898 to 1901. He again occupied this position in 1904 and served as secretary from 1905 to 1908 and as superintendent for the years 1908 and 1909. Until recent months, superintendents of health have been on duty officially an average of about one hour each day.

The qualifications and duties of the superintendent are not set forth in the act of 1909 which reorganized the health department, nor is any mention made of this position as such in the city ordinances or charter. The board of health, which was abolished, included a health officer as a member of the board, and city ordinances prior to 1909 specify his duties but are not clear how the title was established.

There appear to be confusion and inconsistencies in the sections of the various legislative acts and city ordinances relating to the chief executive of the health department, and the technical legal phases of this situation should be carefully considered. The present health department is held responsible for the performance of the duties and functions as previously prescribed for the board of health, but the exact status of the superintendent does not seem to be clearly defined.

In practice, however, the superintendent has occupied the position of the executive head of the department, under the direction of the mayor, as commissioner of health, and the duties formerly required of the board of health have been assigned to him. The several duties required of the previous board of health, and which are probably still in force, have been abstracted and will be found in the appendix.

There is no particular evidence to indicate that in the past any considerable time has been given to the duties of this important office, and for obvious reasons. Except in times of epidemics or similar occasions of special emergency, the routine activities of the several divisions as organized have been largely left to subordinates. Special measures have from time to time engaged the personal attention of the chief executive.

The responsibility for the operation of the affairs of this department does not rest alone with the superintendent of health. A large share of this responsibility must be placed upon the municipal authorities who have controlled the policy and personnel of this department.

SECRETARY.

The position of secretary was created by the taxing district act of 1879. Under the provisions of this act it was required that he be a physician, and certain duties were assigned to him by city ordinances. As a member of the board of health this position appears to have been abolished by the act of 1909, although the title has been continued up to the present time.

The secretary has apparently always been employed on part-time service, and, as his duties are largely concerned with the control of communicable diseases, his activities will be considered later in the discussion of that function.

HEALTH OFFICER.

The position of health officer was likewise created by the taxing district act, and under the provisions of the city ordinances he appears to have been the executive officer of the board. When the original board of health was abolished and the present health department established in 1909 the newly created position of superintendent of

health assumed the duties previously delegated to the health officer. Under the organization of the health department, the health officer does not appear to have been assigned to any regular division of activities, and this position, prior to March, 1920, was filled by part-time physicians. For this reason the duties of the health officer will be discussed here.

Beginning March 1, 1920, this position has been filled by a full-time physician, who had previously served as school inspector from 1910 to 1915. The present salary is $1,800, and in addition he is allowed gasoline, oil, and repairs for his private automobile.

The present health officer visits a few of the communicable diseases reported for the purpose of confirming diagnosis. When called by school nurses he also visits cases, to establish diagnosis.

A considerable portion of his time is taken up in vaccinating against smallpox at the city office. School children and contacts required to be vaccinated receive this service free. He also administers antirabic treatment when necessary. Vaccinations against typhoid fever will be undertaken during the summer months.

Physical examinations of minor children who are being placed in employment are made by the health officer and the proper certificate issued. Between three and four hundred of these examinations have been performed annually.

OFFICE MANAGEMENT.

One clerk is on duty in general charge of the office affairs, although she does not appear to assume any special authority. Her present salary is $100 per month. It is her duty to perform such stenographic services as are necessary, and to keep such records, schedules of expenditures, and pay rolls as are required.

Beginning April 1, 1920, she became deputy registrar of vital statistics, and for these services receives $30 each month by special arrangement with the registrar, who is appointed by the State and has no connection with the health department. Practically all of the certificates of births and deaths are received by the deputy registrar, who issues the required burial permits.

One maid, colored, has been employed in the office for about 14 years for general office and messenger service at a present salary of $50 per month. She is quite familiar with office routine and records, and her services have undoubtedly been worthy of the hire.

The communicable disease clerk, although on duty full time in the office, will be discussed under the section on communicable diseases.

Phone calls registering complaints, reporting communicable diseases, and other matters referred to the health department are received by whoever may be available at the time of call.

Monthly report.—There is issued each month a "mortality report," consisting of four pages about 8 by 10 inches in size. The first page contains only the names of the commissioners and certain officers of the department. There follows a table giving the causes of deaths that have occurred during the month by color and age groups. The total numbers of births and cases of communicable diseases reported are recorded. Statistical summaries of the monthly reports made by the chief sanitary inspector, city chemist, milk and food inspectors, contagious disease inspector, supervisor of nurses, and other special reports of like nature are included.

In these monthly reports, covering a period of about two years, there has been no attempt at any discussion of pertinent health problems or effort made to reach the general public in any campaign of popular education in public health matters. About 300 copies are mailed each month to physicians and other health departments.

Annual report.—The Fortieth Annual Report of the department was published in 1918. These reports are now merely statistical compilation of births and deaths and include summary reports of the several divisions. Accumulative tables of total deaths and deaths from several causes have been continued each year. There has been for a number of years no general discussion of activities, and these reports appear to have been edited as a more or less perfunctory repetition of previous reports. The same summaries have been continued from year to year and in themselves would indicate but little real progress. Many errors will be found in the statistical tables and it was not found possible to check the figures given with previous original records.

Other publications.—As far as could be determined, no studied program of publicity has been undertaken. A few leaflets on some of the more common communicable diseases have been printed and used in connection with control measures undertaken.

In reorganizing and expanding the activities of this department, careful attention should be given to publicity through all the available channels in order to educate the public, and particularly the individual, in matters pertaining to personal hygiene and disease prevention in general.

Sanitary code.—The various State laws, legislative enactments, and city ordinances pertaining to public-health matters have never been codified and the files of the health department did not contain a complete set of them. A brief review of these laws and ordinances indicates at once the necessity for a careful study and revision in order to straighten out many apparent inconsistencies and bring them up to date. The revised and extended health ordinances and regu-

lations should then be codified and made readily available in convenient printed form for reference and distribution among physicians and others concerned in their enforcement.

II. Vital Statistics.

The State vital statistics act of 1913 created a central bureau of vital statistics under the supervision of the secretary of the State board of health. Each city, incorporated town, and civil district in the State became a primary registration district, and the assistant secretary of the State board of health was made registrar for the State. Local registrars are appointed in each primary district, and they are authorized to appoint deputy registrars. The model law for vital statistics is followed, and the revised United States standard certificate of death, approved by the United States Bureau of the Census, is used.

REGISTRATION OF BIRTHS AND DEATHS.

On April 1, 1920, a physician was appointed local registrar, the position having been filled previously by a layman. The health department office clerk was appointed deputy registrar and attends to practically all the business of this office.

From 1848 to 1905 transcripts of original death certificates were made in large registers and are filed in the health office. From 1906 to 1913 the original certificates have been bound in cloth and filed chronologically. Since 1913 transcripts have been made, the originals having been forwarded to the State registrar each month. Some of the recent records have been lost. Many of the transcripts are poorly made and often illegible, and apparently no special care or attention has been given to correctness of diagnosis or completeness of records.

Birth records since 1886 have been recorded in a similar manner and are often incomplete. It has been estimated that probably about 75 per cent of all births are being reported. Deaths are probably nearly all reported.

The health department has had free access to the registrar's records, as this official has been given office space in the department's offices. The records of births and deaths have been kept also in registers for the use of the health department, although at the beginning of the present survey the records for the past two years had not been copied.

As far as could be determined, no special tabulations or study of these records have been made except the tables included in the monthly and annual reports of the department.

Greater care should be exercised in securing more accurate statements as to causes of death: and it is believed that it would be desirable to have the registration of births and deaths placed directly in the hands of the health department.

Chart I gives the curves for the total death rates from 1900 to 1919 and the curves for total deaths by color for this period. There has been during this period no tendency toward a decreasing death rate, and it will be noted that the colored death rate has progressively increased. This fact should receive serious consideration and efforts should be made to reduce this increasing mortality among the colored population.

Because of local hospital facilities there are undoubtedly many deaths of nonresidents included in the records for the city of Memphis. It was found difficult and in many cases impossible to pick out the nonresident deaths on account of incompleteness of data supplied on the certificates. Attempts to determine the number of nonresident deaths for the years 1916 and 1917 from the records failed to check even reasonably close with the table published in the annual report of the department.

TABLE I.—*Showing total births and deaths reported by color, 1909–1918, city of Memphis.*

Year.	Births.			Deaths.		
	White.	Colored.	Total.	White.	Colored.	Total.
1909	1,299	721	2,020	1,107	1,239	2,346
1910	1,853	987	2,840	1,329	1,489	2,818
1911	1,780	930	2,710	1,328	1,505	2,833
1912	852	405	1,257	1,332	1,647	2,979
1913	1,757	748	2,505	1,262	1,496	2,758
1914	1,438	697	2,135	1,299	1,690	2,989
1915	1,438	697	[1] 2,135	1,303	1,597	2,900
1916	1,580	715	2,295	1,216	1,427	2,643
1917	1,588	773	2,361	1,399	1,559	2,958
1918	1,480	540	2,020	1,831	1,732	3,563

[1] Total births by color for 1915 are the same as those published for 1914, obviously an error.

NOTE.—The above figures are taken from the annual reports of the health department and are subject to revision.

CONTROL OF MIDWIFERY.

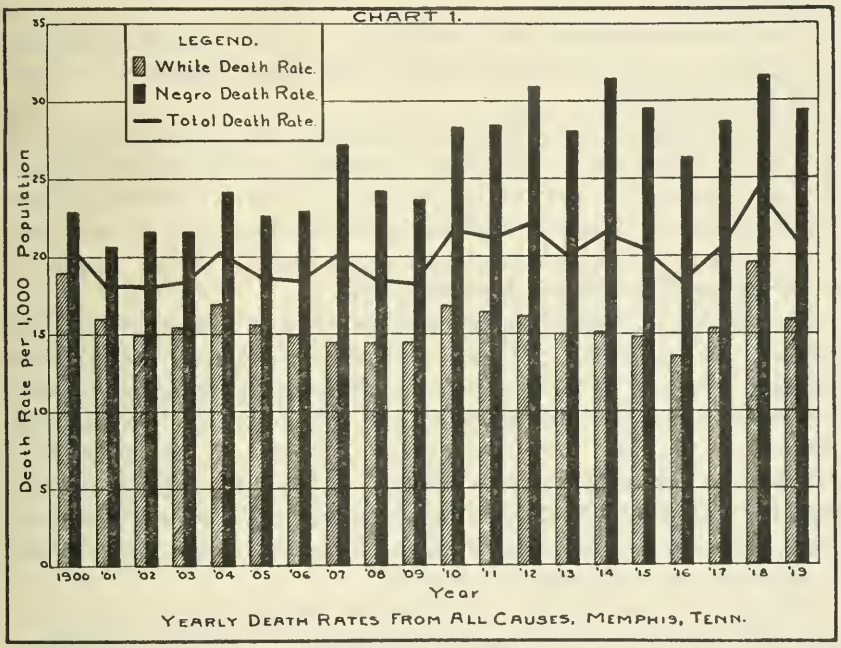
An ordinance passed in 1910 provides for the regulation of the practice of midwifery by the issuance of a permit after applicants have passed a satisfactory examination prescribed and conducted by the superintendent of health, with a fee of $5. As far as could be determined there has been no very effective control over midwives.

III. CONTROL OF COMMUNICABLE DISEASES.

The prevention and control of communicable diseases is considered the most important function of a modern health department.

Many boards of health, even to-day, have been established and are being operated on the theory that the control of communicable diseases depends largely upon successful sanitary regulation of the environment, and for this reason large sums of money and great expenditures of energy have been directed to all sorts of nuisances and conditions of filth as being responsible for the origin and spread of many diseases.

Preventive medicine has pointed out the more vital importance of controlling the individual who is sick or may be infected with any communicable disease. It is the individual, therefore, that becomes the dangerous focus from which disease is spread, and in the



measures adopted for the control of communicable disease, activities must be directed toward the individual rather than the environment, and the division of communicable disease, therefore, becomes the most important division in the modern health department.

In Memphis at the present time there is no well-defined division for the control of communicable disease. The various activities that ordinarily are associated with such a division will be considered here. This will include morbidity reporting, the duties of the secretary, health officer, contagious-disease inspector, sanitary officer, school nurses, and the diagnostic laboratory.

MORBIDITY REPORTING.

Provisions of State laws and city ordinances require the reporting of the following communicable diseases:

Cholera,
Bubonic plague,
Typhus fever,
Yellow fever,
Smallpox,
Diphtheria,
Mebranous croup,
Scarlet fever,
Chicken pox,
Typhoid fever,
Tuberculosis,
Measles,
Cerebrospinal meningitis,
Infantile paralysis (1912),
Malaria (1917),
Syphilis (1918),
Gonorrhea (1918),
Chancroid (1918),
"And other communicable diseases."

The laws, ordinances, and regulations adopted for the reporting and control of communicable diseases have been abstracted and appear in the appendix.

A report blank printed upon a postal card has been provided for the use of physicians. This blank contains spaces for the disease reported, name of the patient, age, duration of illness, business, and for special notations in case of diphtheria, tuberculosis, and chicken pox. City ordinances require that these reports shall be made "in person or in writing" to the health department.

In practice, reports of communicable diseases are practically all received by telephone. Whoever answers the phone call records the data given on a daily report blank, which provides for name, address, disease, by whom reported, age, sex, and color. In addition, spaces are provided for "disposition, referred to, remarks, final disposition, and date." These blanks are kept in a blotter usually until the end of each week, at which time they are filed in a loose-leaf binder by the communicable-diseases clerk, and at the end of each month they are tied together and filed.

This daily report blank is used also for noting various complaints and calls coming in to the health department. The data concerning communicable diseases reported is frequently incomplete.

The communicable disease clerk fills out a small printed slip (1) from the information received and recorded in the daily report, noting the character of the disease, name, address, age, sex, and color (when given). She also prepares a card (3 by 5) for each case (2) on which is noted the street, date, name, date of fumigation or release, by whom fumigated, and date There is a space for remarks, and different colors are used for different diseases. These become the current records, and they are filed in drawers alphabetically by disease until the termination of fixed periods of isolation,

at which time another card (3 by 5) is made out (3) to show when released for fumigation, street, house, by whom fumigated, date, and remarks. After report of fumigation, the card is also filed in the office.

The communicable disease clerk also receives and files reports of venereal diseases on a form provided by the division of venereal diseases, United States Public Health Service. These report blanks are supplied to the physicians, and the return blank is mailable under penalty frank, requiring no postage. A weekly return of these cases is made to the State board of health.

There is also prepared and mailed each week to the Surgeon General of the Public Health Service the municipal weekly morbidity report, giving the number of cases of communicable diseases reported during the week.

The communicable disease clerk also keeps the registers of births and deaths, in which are copied transcripts of the records kept by the registrar of vital statistics. She also receives all copy for monthly and annual reports and prepares it for the printer.

PERCENTAGE OF CASES REPORTED.

The only data readily available that would permit of an estimate of the percentage of cases reported are the tables published in the annual reports. From these records it would appear that the percentage of reporting for the more common diseases has been only fairly satisfactory at times, and varies rather noticeably from year to year.

Table II was compiled from data printed in the annual reports. Some of the diseases listed would appear to have been fairly completely reported in some years. It was not possible to check these figures.

TABLE II.—*Showing total cases and deaths reported for certain diseases, Memphis, Tenn., 1909–1919.*

Diseases.	1909		1910		1911		1912		1913		1914	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Whooping cough	.....	.....	.....	.....	.....	.....	.....	.....	100	13	(1)	.....
Scarlet fever	226	11	176	7	94	3	41	2	101	12	143	2
Diphtheria	244	16	185	13	125	15	108	10	111	17	170	20
Typhoid fever	.....	.....	190	36	623	82	631	67	284	49	427	59
Tuberculosis	.....	.....	.....	.....	167	320	160	275	347	334	335	390
Smallpox	340	3	265	.....	198	1	15	.....	81	.....	33	.....
Chicken pox	.....	.....	.....	.....	101	2	124	.....	264	.....	122	.....
Measles	.....	.....	.....	.....	1,277	9	450	1	753	4	1,136	6

[1] In the annual reports for 1914 and 1915, the same totals of cases of the diseases are found in both reports, obviously an error. Similar errors have occurred in other reports and consequently the accuracy of the figures taken from these reports can not be vouched for as it has not been possible to check them with original records.

TABLE II.—*Showing total cases and deaths reported for certain diseases, Memphis, Tenn., 1909–1919*—Continued.

Diseases.	1915		1916		1917		1918		1919	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Whooping cough	[1]	.....	31	2	400	11	72	8	.....	.....
Scarlet fever	143	5	157	6	177	4	147	2	.....	.....
Diphtheria	170	14	314	17	474	23	210	12	.....	.....
Typhoid fever	427	38	512	72	248	32	118	23	.....	.....
Tuberculosis	335	361	826	394	770	408	778	406	[2] 441	[2] 342
Smallpox	33	.....	23	.....	361	.....	327	.....	.....	.....
Chicken pox	122	.....	269	.....	269	.....	172	.....	.....	.....
Measles	1,136	1	523	.....	2,640	15	519	4	.....	.....

[1] In the annual reports for 1914 and 1915, the same totals of cases of the diseases are found in both reports, obviously an error. Similar errors have occurred in other reports and consequently the accuracy of the figures taken from these reports can not be vouched for as it has not been possible to check them with original records.
[2] From monthly reports.

In attempting a review of the control measures carried out at the present time it was found that there appears to exist but little coordination of the various control activities under any one head or authority. An outline of the work carried on by several officers and divisions will follow.

PLACARDING.

One sanitary inspector who has been detailed as and known as the sanitary officer is given the printed slips (1) already mentioned, and he proceeds at once to the proper address and placards the cases reported. This placard bears the name of the disease. He is instructed to inquire concerning the number of school children and adults employed who reside at the place of residence in which has occurred a communicable disease. He also is required to ascertain the source of the milk used by the patient and whether the house is screened, noting all these facts upon the slip. which he returns to the office.

This officer is said to revisit cases when there is doubt as to the observance of isolation, and also to remove the placard at the termination of the case. It was stated that all cases reported are placarded, with the exception of tuberculosis, malaria, and mumps. It is believed that the placarding constitutes the principal function of this officer. He is apparently not qualified to perform functions connected with epidemiologic study.

ISOLATION.

The posting of a placard is intended as a warning of the existence of communicable disease, and to establish a period of isolation, in scarlet fever three weeks or more; in measles not less than 15 days.

The contagious-disease inspector, who is a layman of over 20 years' service in the department, states that he visits all reported cases of

smallpox, cerebrospinal meningitis, diphtheria, scarlet fever, and typhoid fever, and placards some of them. Upon the first visit to any of the first four diseases mentioned the breadwinner is notified to present himself at the health office in order to secure a permit to continue his employment. If school children are found residing at placarded premises their names and the name of the school attended are reported to the office.

He states also that he issues instructions that all cases must be isolated, and he is provided with one-page printed instructions to be left at all cases of scarlet fever and measles. Instruction folders formerly distributed by this inspector for the management of cases of typhoid fever and diphtheria have not been used for some time. In previous years several antifly leaflets and posters have been used.

The contagious-disease inspector revisits placarded premises occasionally, but it is difficult to believe that satisfactory and effective observance of isolation can be assured in many cases.

FUMIGATION.

It is the duty of the contagious-disease inspector to fumigate after the termination of cases of diphtheria, scarlet fever, smallpox, cerebrospinal meningitis, typhoid fever, and tuberculosis, and occasionally for other conditions. The following routine is carried out: About 8 ounces of formalin per 1,000 cubic feet of space is sprayed by means of a hand pump over such articles as mattresses, carpets, linen, etc., and the occupant is directed to air the rooms after 8 hours and then clean up the room or rooms. It was stated that this use of formalin made a general cleaning up rather necessary.

For cases of typhoid fever, during the course of the disease, it has been the practice to furnish chloride of lime as a disinfectant for discharges, toilets, etc. This disinfectant is also freely used when cellars have been polluted with sewage.

HOSPITALIZATION.

The Memphis General Hospital is owned by the city and operated by a board of trustees in connection with the University of Tennessee. It has a maximum capacity of about 210 beds and accepts cases of typhoid fever.

Three small frame buildings in the rear of the city hospital are used as a communicable disease hospital. The small central building serves as quarters for a nurse who is on continuous duty during her detail. In one of the ward buildings there is a small office and a diet kitchen, and in both ward buildings five rooms holding three beds each, rather poorly furnished and heated with open grates. Scarlet fever, diphtheria, measles, chicken pox, and erysipelas cases are received here.

Smallpox cases are cared for at a pest house owned and operated by the Shelby County authorities and located about 6 miles from the city. There are about 30 beds available here and cases are transferred by a private ambulance at the city's expense.

Present facilities for the hospitalization of cases of communicable diseases are manifestly most inadequate. It would be possible to care for only 15 cases in the small communicable disease hospital, provided the sex, color, and disease happened to correspond to the available number of rooms.

Provisions should be made at once for the erection of a suitable hospital for the care of cases of communicable disease, with a minimum capacity of at least 100 beds, and it should be located preferably on the grounds of the city hospital.

DUTIES OF SECRETARY.

The principal function of the secretary to the health department consists in visiting reported cases of smallpox and such diseases as meningitis and infantile paralysis, in order to establish diagnosis.

When a diagnosis of smallpox is established the case is usually removed to the pesthouse unless conditions at the place of residence warrant isolation at home. The sanitary officer proceeds to serve vaccination notices to all families or households in the block where smallpox is found, ordering all persons therein to be immediately vaccinated either at the health office or by private physicians.

It was stated that isolation was probably not very effectively carried out in many of the cases treated at home. The secretary makes an effort to vaccinate all possible contacts.

The secretary also is required to compile data for the monthly and annual reports. He has no regular hours of duty, but answers calls from physicians and the health office. He has served as secretary or health officer for a number of years.

The duties of the health officer in connection with communicable disease have already been described.

PUBLIC-HEALTH NURSING.

During the school term the health department nurses are on duty at the schools from 9 a. m. to 3 p. m. From 3 p. m. until about 5 p. m. their time is spent in visiting absentees and such cases of scarlet fever, diphtheria, typhoid fever, and malaria as may occur in their districts. The city is divided into about 16 school districts and each nurse is assigned one or more of these districts.

At the close of school hours the nurse usually calls the health office for records of cases of communicable diseases reported in her district, and within the time then at her disposal she pays visits to these cases

and secures certain epidemiologic data on mimeographed forms provided for the purpose.

When the communicable disease inspector, secretary, or other officer finds school children in families having a case of any communicable disease he notifies the office and a form post card giving the necessary information is mailed by the communicable disease clerk to the school attended and the exclusion of the children follows.

During the period of the year when the schools are closed the nurse's time is divide between follow-up work from school records and public-health nursing visits in connection with communicable diseases. Just how effective this latter work has been could not be determined.

The following summary of "follow-up" work appears in the annual report of the health department for 1918, the last report available:

Public health nursing activities, 1918.

Number of visits made to investigate tuberculosis	1,887
Number of visits made to typhoid fever	83
Number of visits made to investigate scarlet fever	140
Number of visits made to investigate diphtheria	210
Number of visits made to investigate other diseases	2,232
Number of cultures taken for diphtheria (diagnostic and release)	877
Number of cultures taken for Widal	26
Number of smears for malaria	53
Number of instruction visits	2,380
Number miscellaneous visits	2,671
Number nursing visits to influenza	944
Number children sent to hospitals for operations	54
Number referred to all clinics	690
Number sent to hospitals, influenza	120
Number referred to charities	79
Secured glasses for	13
Referred to visiting nurses' association	152
Calls transferred to juvenile court	4
Total calls made	11,503

DIAGNOSTIC LABORATORY.

The following summary for the year 1918 indicates the character of the examinations made in the health department laboratory for diagnostic purposes:

	Positive.	Negative.
Diagnostic cultures for diphtheria	198	2,388
Release cultures for diphtheria	198	464
Blood for Widal reaction	52	745
Blood for plasmodium	59	504
Sputum for tubercle bacillus	195	530
Specimens for typhoid release	2	84
Heads for negrii bodies	25	28
Total	729	4,743

There are about 10 private laboratories in the city, and it was apparent that physicians generally do not patronize the city laboratory to any great extent. In the above summary many of the diphtheria cultures (877) were secured by the city nurses, and many of the specimens examined for the Widal reaction were secured during a special search made for typhoid carriers.

Physicians should be encouraged to use and rely upon the health department laboratory for diagnostic purposes and facilities for all routine and special examinations, including the Wassermann test, should be provided. The present city chemist is required to devote too much of his time to other activities.

DIPHTHERIA.

The routine meaures of placarding and disinfection have already been briefly outlined. School children are required to remain away from school until after disinfection.

The school nurses visit all cases reported, give instruction for proper care of patients and bedside prophylaxis, determine possible contacts, and note certain epidemiologic data for each case. They frequently secure throat cultures for diagnosis and release.

Two negative cultures are required before patients are released and one negative culture for contacts. These cultures are examined in the health department laboratory. Blanks and swabs are supplied also to physicians, and the results of examinations are phoned to the physicians and the blank filed. A substation is maintained at a central drug store, where swabs can be secured and diphtheria antitoxin is furnished free to physicians for indigent cases. Druggists are supposed to furnish to the health department a record of all antitoxin sold.

TUBERCULOSIS.

As will be seen by reference to Table III, tuberculosis is very incompletely reported, and as far as could be determined there has been no continuous or extensive effort made to reduce the morbidity and mortality rates from this disease.

In 1909, through the efforts of the department of health, private funds were secured which permitted the opening of some small cottages that had previously been erected for yellow fever patients. This institution served as a tuberculosis hospital until September, 1919, at which time it was destroyed by fire. In 1918, 148 cases were admitted, and 94 deaths occurred during that year.

A hospital for the treatment of tuberculosis, to be known as Oakville Sanatorium, is soon to be erected by joint action of the city and county authorities and operated under the direction of a

board of trustees. A superintendent has already been appointed, and for the present is in charge of a dispensary for tubercular cases maintained in the out-patient department of the city hospital by arrangement with the University of Tennessee. The salary of this superintendent is to be paid from funds secured through a bond issue floated for the construction and operation of the sanatorium.

A social worker was engaged in tuberculosis work for about three years, but this activity was discontinued in April, 1920. Some field work has been undertaken by the school nurses, 1,887 visits being made in 1918, and only 707 in 1919.

A fresh-air school is maintained by the board of education, with an enrollment of about 25 children with definite or suspected infections. One health department nurse is on duty here from about 8 a. m. to 3 p. m., the balance of her time being devoted to follow-up visits in the homes of these children. A physician is engaged in part-time service for general attendance, physical examinations, and medical supervision.

A dispensary was maintained at the police station until recently, when by arrangement the "city dispensary" became part of the out-patient department of the University of Tennessee Medical School.

The Public Health Nursing Association, a private organization, cared for 82 cases of tuberculosis during the year 1919.

A fresh-air camp has been maintained at the fair grounds for several years and five or six children have been cared for there.

The Shelby County Tuberculosis Association, a private organization, has performed some nursing of tubercular patients, and plans are under way for the construction of a preventorium near the Oakville Sanatorium.

TABLE III.—*Deaths and death rates from tuberculosis (all forms) by color, Memphis, 1901–1918.*

Years.	Deaths.			Death rates per 100,000.		
	Total.	White.	Colored.	Total.	White.	Colored.
1901	256	.....	.....	242.1	.....	.....
1902	296	.....	.....	272.4	.....	.....
1903	217	.....	.....	194.5	.....	.....
1904	272	.....	.....	237.7	.....	.....
1905	295	.....	.....	251.6	.....	.....
1906	268	115	153	223.0	167.8	296.3
1907	257	93	164	208.8	130.6	316.2
1908	274	100	174	217.5	135.5	334.0
1909	289	109	180	224.5	142.5	344.0
1910	350	127	223	266.1	160.9	424.3
1911	321	117	204	240.4	144.9	386.7
1912	349	133	216	257.4	161.2	407.1
1913	374	133	241	271.8	157.8	452.1
1914	429	107	322	307.3	124.3	601.2
1915	425	125	300	300.0	142.3	557.4
1916	390	87	303	271.7	97.2	560.4
1917	412	133	279	286.8	145.7	513.8
1918	449	141	308	303.8	151.4	562.6

Table III, with the exception of data for the year 1916, was prepared from the total deaths given in the mortality reports published by the United States Bureau of the Census. Deaths for 1916 were not given and the figures used were taken from the annual report of the health department. In computing death rates, census enumerations were used and a correction made for the population annexed on December 1, 1919. It is believed this correction will more nearly represent actual populations for the years 1910–1918. The yearly averages for colored population for 1910–1918 were computed at the same relative increase that occurred from 1900 to 1910.

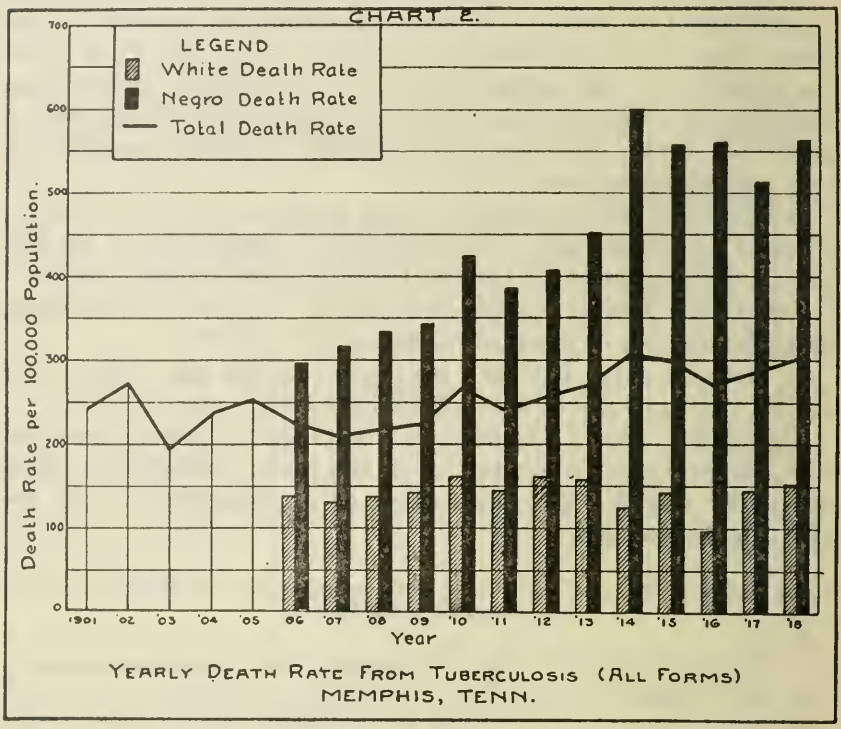


Chart 2 is based upon Table III and is presented to show graphically the excessively high death rates from tuberculosis among the colored population as compared to the mortality from this disease occurring among the white population. The opinion was expressed locally that there had been a falling off in the total colored population during the past few years. The 1920 census enumerations are not yet available, and if the population estimates used in Table III for computing colored death rates prove to have been too high, the actual rates for the colored population will be still further increased.

If the data used in these compilations are fairly accurate the total death rates from all forms of tuberculosis have been steadily increas-

ing since 1903, the only year in the period studied in which the mortality was less than 200 deaths per 100,000. Since 1916 there has been no appreciable change in the mortality among the whites while the colored death rate has alarmingly increased.

In attempting to reduce this appalling death rate from tuberculosis concerted action on the part of the several available agencies, official and nonofficial, should be secured and the activities centralized under the general supervision of the health department. The assistance and active cooperation of the local Red Cross, associated charities, public-health nursing association, and all the various agencies having to do with industrial conditions should be obtained.

The tuberculosis problem in Memphis is a vital one. The high colored death rate from this disease indicates the necessity for the adoption of drastic measures for early diagnosis, prompt notification of all cases, adequate provision for the isolation and care and treatment of dangerous open cases, including the necessary public-health nursing service, and a strenuous educational campaign.

MALARIA.

In 1917 measures for the eradication of mosquitoes were undertaken under the direction of officers of the Public Health Service. This work was carried on by the city health department to some extent during 1918 and 1919.

An outline of the mosquito-control measures that seem necessary for the present year has been prepared under the direction of Surg. L. D. Fricks, in charge of the field division of malaria investigations in the United States, and a copy is included in the appendix to this report. It was estimated that $10,000 would be necessary for work in 1920.

In 1919 a form for securing a clinical and economic history of malaria cases reported to the health department was prepared by Dr. Fricks, and some of this data has been collected by the city nurses.

No special study of the malaria morbidity and mortality records has been undertaken. Many of the deaths given as malaria are probably the result of other infections and conditions. Physicians should be encouraged to avail themselves of the laboratory facilities offered in order to definitely establish a diagnosis in suspected cases.

VENEREAL DISEASES.

The recent war served to bring into the limelight the extent and seriousness of venereal infections. There is being accumulated a mass of evidence that will convince even the skeptical that the sup-

pression and control of syphilis and gonorrhea constitutes one of the most important problems confronting every city to-day, and that the time has come when the cloak of secrecy and privacy, so long favoring continued spread of these infections, must be thrown aside and the public health aspect of these diseases given proper recognition and action, as well as their so-called "social" or moral relations.

City ordinances adopted July 30 and October 29, 1918, and rules and regulations of the State board of health under date of June 23, 1919, provide for the reporting and control of venereal disease.

There were reported to the city health department during the period of nine months from July 1, 1919, to April 1, 1920, 1,200 cases of venereal disease, as follows: Syphilis, 515; gonorrhea, 526; and chancroid, 159.

The program now being carried on for the suppression and control of venereal diseases has been developed under the direction of a Public Health Service officer in charge of State-wide work in cooperation with the State board of health. These activities have been tied in with and have broadened the work of the venereal disease clinic previously operated in connection with the out-patient department of the University of Tennessee Medical School. From the State allotment of Federal funds there was apportioned to the city of Memphis approximately $3,600 for the fiscal year ending June 30, 1920. A social worker was added to this clinic in December, 1919.

Free night clinic.—Under the direction of the State officer in charge of the division of venereal diseases a free night clinic for men has been established at the out-patient department at the university between the hours of 7 and 11 p. m., and from the State allotment one director of clinics and one male nurse were engaged for part-time service, each at a salary of $100 per month. Cases of syphilis are admitted to the city hospital for the administration of arsphenamine.

Examination of arrested women.—As a far as possible, women arrested by the police are held for examination when there is reason to believe they are infected. On February 1, 1920, the city appointed a chief of the women's protective bureau under the department of police and provided her with office quarters at the central police station and in addition two protective officers and one clerk. This officer had previously come to Memphis in October, 1918, in connection with the law enforcement division of the Committee on Training Camps Activities.

In May, 1919, there was appointed one examining physician, who was placed upon the health department pay roll at a salary of $60 per month, and one health department nurse was assigned to duty at this police clinic. Active examination of suspected women was begun in

June, 1919. These examinations are conducted usually in the forenoon for such suspects as can be held over. Occasionally some of the examinations are made at the night clinic.

Of the 94 women arrested by the police and 19 others brought in from other sources, 32 were examined for venereal diseases, and of this number the diagnosis of positive syphilis was established in 14 and positive gonorrheal infection in 3. Seven of these were sent to the detention home for women, 15 to the workhouse, 7 to the clinic at the out-patient department, and 3 allowed to continue proper treatment with private physicians.

Detention home for women.—A temporary detention home was established in January, 1919, for venereally infected white women. Those who are also drug addicts are placed in the workhouse. The director of clinics and volunteer physicians treat these detained cases. About 150 girls and women have been cared for at this detention home, and because of its physical condition plans are under way for new quarters.

Plans for coming year.—The State officer in charge of venereal disease has submitted to the mayor and health department a plan and budget for the continuance of the venereal-disease work for the fiscal year beginning July 1, 1920. In order to make available to the city its portion of the Federal fund allotted to the State of Tennessee, this budget calls for the appropriation of $5,889 to match an equal sum to be allocated from the State allotment. It is understood that an agreement has been reached to make this budget available.

Because of its important bearing upon the public health the control of venereal diseases should be carried on under the direct supervision of the health department. For this reason it is recommended that there be established in the health department a division of venereal disease as a subdivision of the Bureau of Communicable Disease. The plan of organization and personnel required for such a division should be determined after further conference with the officer in charge of the State division of venereal disease.

TYPHOID FEVER.

In 1919 the city of Memphis had the highest death rate from typhoid fever among 60 large cities in the United States having populations over 100,000. This unenviable rate of 58.4 deaths per 100,000 population was also the highest death rate occurring in any of these large cities since 1911, in which year Memphis again headed the list.

The following table is compiled from data published in the Journal of the American Medical Association on March 6, 1920, and

serves to compare the mortality from typhoid fever in a number of southern cities:

TABLE IV.—*Comparison of death rates from typhoid fever of the city of Memphis with other southern cities.*

Cities.	Death rates per 100,000 population.				
	1919	1918	Average 1916–1919.	Average 1911–1915.	Average 1906–1910.
Memphis, Tenn	58.4	15.9	32.6	42.5	35.3
Nashville, Tenn	15.8	32.7	23.5	40.2	61.2
Birmingham, Ala	14.6	31.9	35.8	.....	.....
New Orleans, La	13.7	20.1	20.0	20.9	35.6
Dallas, Tex	12.2	12.6	17.9	.....	.....
San Antonio, Tex	9.6	54.3	26.6	29.5	.....
Atlanta, Ga	9.6	14.4	14.6	31.4	58.4
Louisville, Ky	9.0	12.4	10.8	19.7	52.7
Richmond, Va	3.7	7.5	10.5	15.7	34.0

Table V is presented to show the monthly distribution of typhoid fever in Memphis for the years 1910 to 1919, and the total deaths for these years.

Chart 3 is based upon the data contained in Table V. These curves indicate graphically the average monthly incidence of typhoid for the 10-year period 1910–1919. In computing these rates, the same population figures used in Table III have been employed, and it is believed that the rates as given in the tables and charts will represent minimum rates.

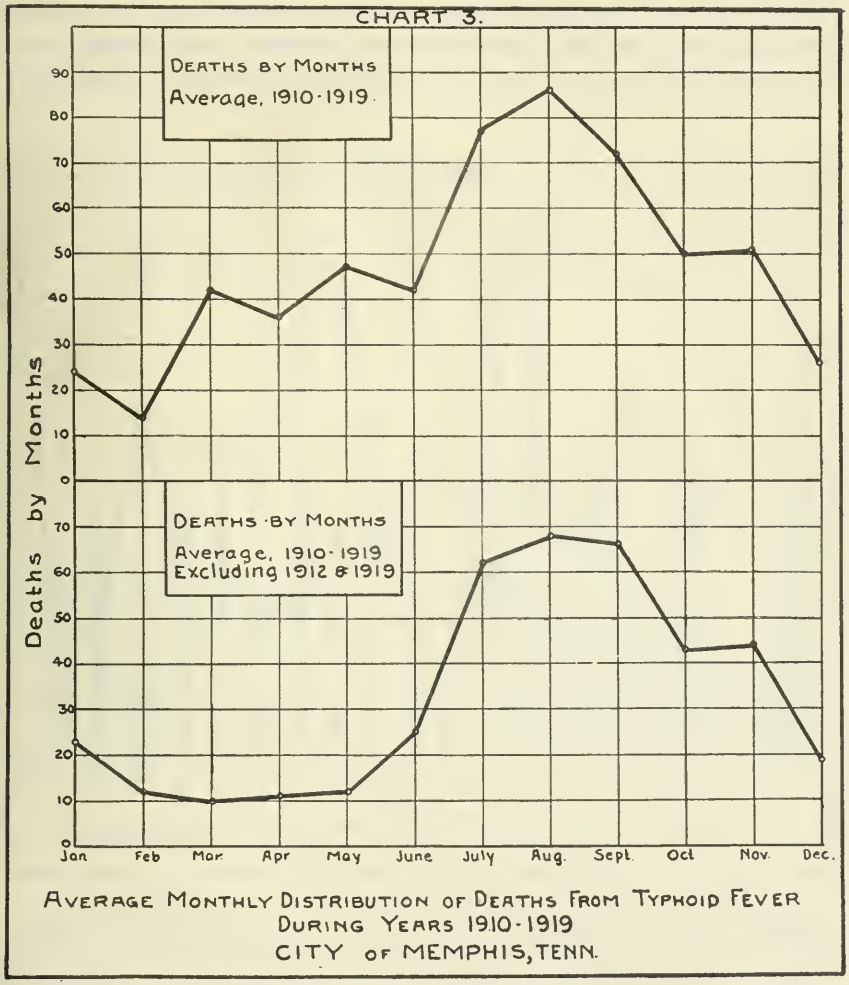
TABLE V.—*Showing deaths from typhoid fever, by months, 1910–1919, city of Memphis.*

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1910[1]	2	1	1	1	3	2	3	4	10	7	2	2	38
1911[1]	3	.....	2	2	3	2	9	26	20	11	6	3	87
1912[1]	1	.....	.....	1	25	13	8	11	4	5	6	6	80
1913[1]	2	5	1	1	.....	3	8	9	9	4	4	3	49
1914[1]	4	3	4	1	2	6	8	4	6	8	11	4	61
1915[1]	4	3	1	4	1	2	6	5	5	4	4	.....	39
1916[1]	3	.....	1	2	1	6	19	10	5	3	12	4	66
1917	1	.....	.....	.....	1	3	5	5	7	4	4	2	32
1918	4	.....	.....	.....	1	1	4	5	4	2	1	1	23
1919[1]	.....	2	32	24	10	4	7	7	2	2	1	1	92
Total	24	14	42	36	47	42	77	86	72	50	51	26	567

[1] Figures secured from the death certificates (transcripts) on file in office of health department. For 1917 and 1918 the data were taken from the annual reports as published by the health department. It will be found that total deaths and deaths by months do not check with published mortality records of the United States Bureau of the Census. The discrepancies appearing in the annual reports of the health department are unexplained. The totals given here are probably sufficiently accurate for indicating at least roughly the monthly incidence of typhoid fever.

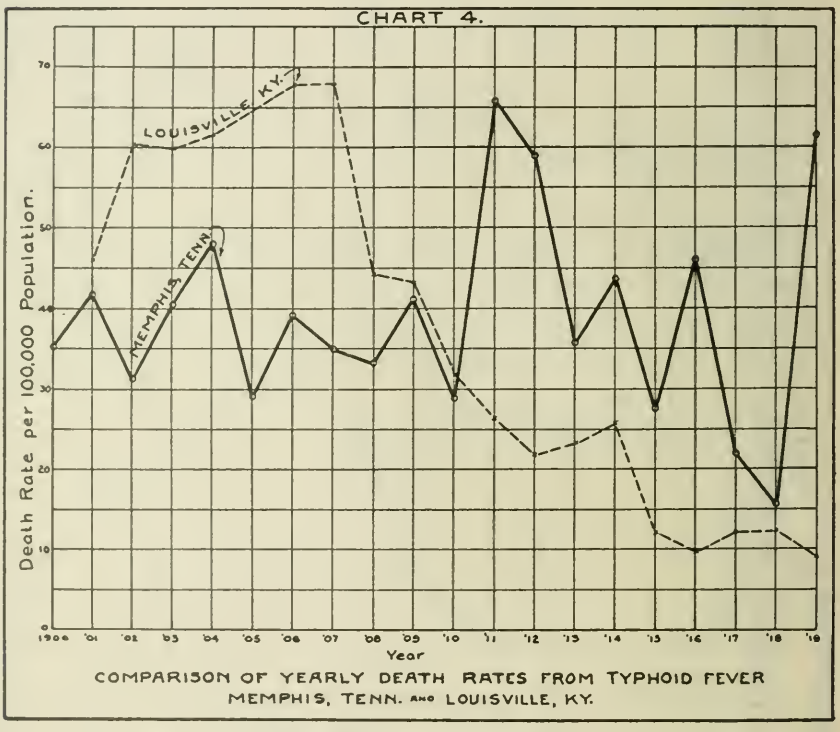
Chart 4 is presented to show the annual death rates from typhoid fever for Memphis for the 20-year period from 1900 to 1919 and for comparison a similar curve for the city of Louisville, Ky., beginning in 1901.

The high peaks for the years 1911, 1912, and 1919 are due to definite epidemics. The relatively lower rates for 1917 and 1918 are encouraging, although the data for these years has not been verified. In the absence of epidemiologic data, the factors responsible for this excessively high mortality from a readily preventable disease can not be definitely determined.



Louisville, Ky., represents a city fairly comparable to Memphis. The curves of typhoid mortality for the Kentucky city indicate a much better control over this infection. The decided drop in the curve following the year 1907 was due to the installation of a safe water supply and the extension of the sewerage system.

Chart 5 gives the annual distribution of mortality from typhoid fever in Memphis by color for the 20-year period from 1900 to 1919. The mortality rate among Negroes has exceeded that of the whites with the exception of the years 1900–1903 and 1917. During the epidemic years 1911, 1912, and 1919 this unequal distribution by color is clearly shown in the chart. In attempting to explain the higher incidence among the Negroes, without epidemiologic study, a number of possible contributing factors must be considered, namely, private well supplies, insanitary privies and yard closets, poor housing conditions and environment, and lack of appreciation of the bearing of

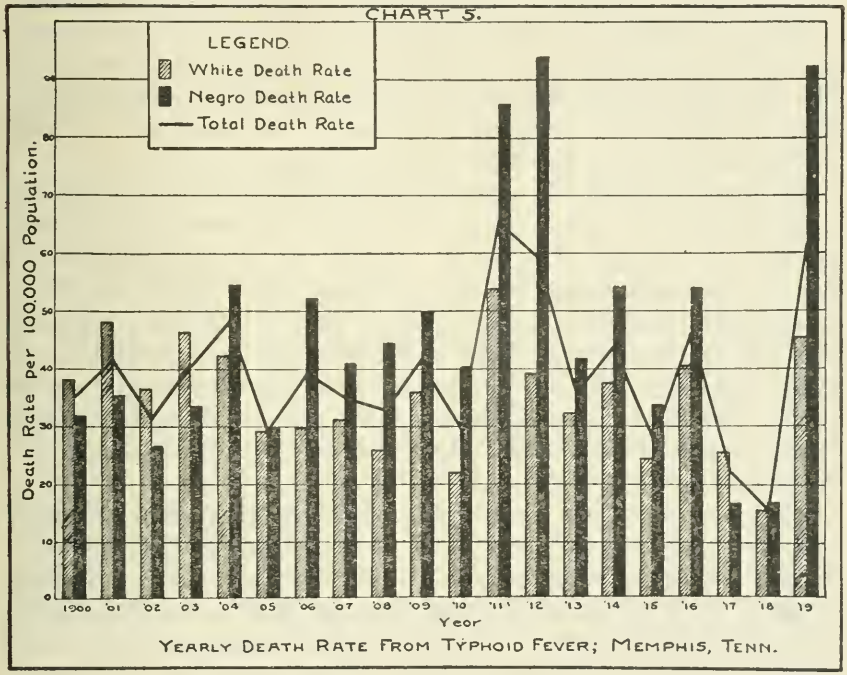


personal hygiene upon the spread of typhoid fever and similar infections.

The high incidence of typhoid fever among the colored population in Memphis has a distinct influence upon its incidence among the white residents because of the distribution of the colored sections and their association with the white families as servants and in other capacities. To reduce the general death rate from this disease it will be necessary to eliminate the factors responsible for its continued high prevalence among Negroes.

Water-borne epidemics.—Although it is generally understood that at least two water-borne epidemics have occurred in Memphis, in 1912 and 1919, there are practically no published records of these epidemics of any epidemiologic value.

1912 epidemic.—In 1912 the Mississippi River overflowed its banks. During the flood stages it is reported that sewer mains were broken, and polluted water found its way into one of the water-supply systems through a broken manhole. Direct pollution of a tunnel collecting water from artesian wells resulted, and 623 cases with 82 deaths are recorded in the annual report of the health department for that year. Table V shows the deaths reported, with the peak of the epidemic occurring in April.



Efforts were made to limit the epidemic by means of a shut-off system. Sprinkling carts were used to distribute safe drinking water, and the mains later disinfected by means of chloride of lime, using 10 to 20 pounds per million gallons of water pumped. Over 10,000 persons were reported to have been inoculated with anti-typhoid vaccine.

1919 epidemic.—Early in the year 1919 there occurred a distinct epidemic of typhoid fever, and again the public water supply has been convicted as the cause of an epidemic. No record of the epidemic has been prepared. It is reported that a sewer main broke

and raw sewage again entered the tunnel system. The record of the total number of cases resulting from this catastrophe was not available. Table V shows the number of deaths reported and, roughly, the chronology of the epidemic which prevailed during February, March, and April.

Other typhoid epidemics.—In 1911 the annual report for that year records the fact that during the summer "the entire southern section of the country was afflicted with typhoid fever." A total of 623 cases were reported, 538 among the whites and 85 among the colored population. No further comment is made as to the probable cause of this epidemic. It seems very probable, although the evidence is not conclusive, that this epidemic may have resulted from contamination of the city water supply. Bacteriological examinations were taken only at irregular intervals, and there had existed and still exists a feeling of security in the purity of this water supply. Subsequent histories of undoubted water-borne epidemics rather strengthens the opinion that the epidemic of 1911 may very probably have resulted from pollution of the public water supply.

In 1916 a considerable outbreak of typhoid fever was attributed to an infected ice-cream supply. No record of this outbreak appears in the annual reports of the health department. In July of that year the city chemist examined blood specimens from persons employed on a dairy located in Oakville, Shelby County. This dairy supplied about 40 gallons of milk daily to the Memphis Ice Cream Co., the milk being used without pasteurization in the manufacture of ice cream. Of four blood specimens, one gave a strongly positive Widal reaction for typhoid. The girl from whom the specimen had been secured died July 29 of typhoid fever.

The cases occurring during this epidemic were quite generally scattered over the city, and there was reported to have occurred a general increase in the incidence of the disease in the surrounding country. The epidemiologic history as collected by the city chemist points to the ice cream sold by the company mentioned above as a possible source of a number of cases. One hundred and fifty-seven cases had their onset during the month of July.

It is most unfortunate that more complete records of the epidemiology of typhoid fever in Memphis have not been assembled. The distinct epidemics that have occurred, and the high endemic incidence of this disease has deserved more serious consideration than has been given.

Study and control of typhoid.—There is no evidence of any real epidemiologic study of typhoid fever. No spot maps or other valuable aids to such a study have been used.

The number of cases reported during the period 1910 to 1918 is shown in Table VI, compiled from annual reports of the health

department. From these data, it is apparent that an average of about 75 per cent of all cases have been reported.

TABLE VI.—*Showing number of cases of typhoid fever reported to health department for the years 1910–1918.*

Years.	Cases reported.	Deaths.	Indicated case fatality.	Years.	Cases reported.	Deaths.	Indicated case fatality.
			Per cent.				*Per cent.*
1910	180	38	21.1	1915	233	39	16.7
1911	627	88	14.0	1916	530	66	12.5
1912	669	80	12.0	1917	248	32	12.9
1913	289	49	16.9	1918	118	23	19.5
1914	436	61	13.9				

The cases reported are placarded by the sanitary officer or contagious disease inspector. Each case is said to be visited by a health department nurse who is supplied with a form card for the collection of epidemiologic data. A similar card is provided for the contagious disease inspector. The information called for on these cards is fairly complete and would serve as the basis of study, but as far as could be determined there has been no use made of such data. These cards are merely filed in current files until the termination of the cases.

The bedside prophylaxis of cases of typhoid fever is apparently left to such directions and instructions as may be given by the attending physician. The nurses do not, as a routine at least, revisit these cases. The contagious diease inspector provides chloride of lime for some cases for use as a disinfectant of infectious discharges, etc.

It is extremely doubtful if small outbreaks of this disease could be detected on account of the very limited data collected and the absence of the necessary epidemiologic study.

Factors responsible for typhoid fever in Memphis.—A brief description of the public water supply system will be given under a separate heading. Reference has already been made to the epidemics caused by direct gross pollution of the public supply. Without more extensive epidemiologic study, the relation of this factor to typhoid incidence can not be definitely determined.

In addition to the public water supply, circumstantial evidence points strongly to certain other local factors which are very probably vitally concerned in maintaining a high endemic incidence of this disease, namely, numerous private wells, insanitary privies, and so-called "yard closets," excessive fly prevalence, inadequate collection and disposal of garbage and organic filth, and lack of effective control over milk supplies and foodstuffs.

With these conditions in mind, and in the absence of adequate and effective control over actual cases of typhoid fever as dangerous foci of infection for further spread of the disease, it does not seem diffi-

cult to understand the excessive prevalence of this disease. Further reference to some of these typhoid factors will be made under subsequent headings.

The control of typhoid fever is one of the problems confronting the health department of this city. The incidence of this disease may be taken as a fairly reliable index of the general sanitary conditions prevailing, and while some of the factors contributing to its high endemic prevalence are at once apparent, a thorough epidemiologic study should be undertaken at once in order to determine those factors most responsible and every effort made then to eliminate or correct these conditions and thus prevent unnecessary sickness and loss of life.

INFANT MORTALITY.

Since 1910 there has occurred a yearly average of 500 deaths among infants and children under 5 years of age, and for the same period 150 infants for each 1,000 births reported have died during their first year. This latter rate, while obviously high because of the fact that all births are not reported, in actual numbers of deaths represents an annual average of over 350 deaths during the first year of life.

Table VII gives the number of stillbirths and premature births reported to the health department since 1910. There is also included the indicated death rates for all causes under 1 year and 5 years, for diarrhea and enteritis under 2 years, and for other causes in early infancy.

While the percentage of deaths in infants under 1 year of age and in children under 5 years compares favorably with other southern cities and is perhaps lower than the average for all registration cities, there is no reason why strenuous efforts should not be made to prevent this unnecessary sacrifice of innocent lives by the inauguration of measures providing for prenatal care of expectant mothers, the care of newborn, and the health and welfare of children during their helpless ages.

TABLE VII.—*Showing deaths under 5 years of age, by color and certain causes.*

Years.	Number of stillbirths reported.			Number of premature births reported.			Deaths exclusive of stillbirths.												Deaths under 1 year per 1,000 births reported.	Per cent total deaths under 5 years.
							Death rates per 100,000 population.													
							Other diseases of early infancy.			Deaths, all causes, under 1 year.			Diarrhea and enteritis under 2 years.			Deaths from all causes under 5 years.				
	Total.	White.	Colored.	Total.	White.	Colored.	Total.	White.	Colored.	Total.	White.	Colored.	Total.	White.	Colored.	Total.	White.	Colored.		
1910	211	52	159	.....	.....	.....	13.7	6.4	25.0	283.2	239.7	355.8	106.9	115.4	96.1	410.6	342.3	521.2	130.7	18.9
1911	.....	.....	.....	.....	.....	.....	5.3	6.2	3.8	270.7	238.8	325.0	100.0	110.0	86.5	422.6	362.5	523.1	132.8	19.8
1912	.....	.....	.....	.....	.....	.....	32.6	32.9	32.1	297.7	231.7	400.0	71.9	57.3	84.9	434.8	292.7	654.7	319.8	19.7
1913	241	85	156	35	14	21	19.7	19.0	20.8	246.7	180.9	350.9	50.4	42.9	62.3	345.3	260.7	479.2	134.9	17.2
1914	184	77	107	.....	.....	.....	35.3	34.9	35.8	230.9	181.4	311.3	71.9	58.1	94.3	330.2	258.1	447.1	150.4	15.4
1915	211	52	159	.....	.....	.....	14.2	11.5	18.9	168.1	150.6	200.0	49.6	48.3	52.8	250.4	224.1	298.1	111.0	12.2
1916	228	79	149	57	27	30	17.5	20.2	12.9	187.4	164.0	225.9	32.8	28.1	40.7	265.7	226.9	329.6	116.8	14.4
1917	205	65	140	73	39	34	44.8	46.2	42.6	237.2	200.0	300.0	42.1	31.9	59.3	386.2	319.8	498.1	145.7	18.9
1918	212	97	115	39	24	15	31.9	30.1	35.2	199.3	178.5	235.2	45.6	45.2	46.3	333.3	286.0	414.8	145.0	13.8

The above table is based upon mortality statistics taken from the annual report of the health department. These records are incomplete, and because of many errors appearing in the annual reports, the rates given will not represent true death rates.

There has been no systematic or continued program adopted and carried on by the health department along lines of infant or child welfare activities. For a few years the Public Health Nursing Association has undertaken independently a limited amount of infant welfare work during summer months, as shown in the following summary of its activities:

Summary of prenatal and infant welfare work (July, August, September, 1919), Public Health Nursing Association.

Prenatal:	
Number of visits to houses	623
Number of clinics attended	11
Number of deliveries attended	12
Prenatal cases under care Jan. 1, 1920	58
Pregnancies, dismissed to hospitals, etc., for confinement	130
Assistance given:	
Doctors sent	60
Hospital care secured for	113
Prescriptions filled	97
Ambulance sent	43
Infant welfare:	
Baby conferences held with baby specialists in attendance	16
Attendance at conferences	82
Number of babies visited in homes	130
Number of infant welfare visits	985
Instructive visits in care and preparation of food	269
Diseases of early infancy and malformations	141
Care of new born	159

Milk stations.—During the past two years the nurses of the health department have operated eight milk stations during one or more months in summer. These stations have been financed by the Memphis Press, and milk has been supplied to babies without charge. The stations are open from 9 a. m. to noon daily, babies are weighed, and general advice is given to the mothers. In the afternoon the nurses visit the homes for follow-up work. It was stated that from 30 to 200 babies have attended each milk station.

Coordination of activities.—There has been a decided lack of coordination between the health department and other agencies concerning themselves with infant welfare as well as other public health activities. In reorganizing and developing these activities, the full support and cooperation of all nonofficial organizations should be sought and the administration and direction of all prenatal and child welfare activities undertaken in Memphis should be centered in the health department in order to make possible a systematic and comprehensive program.

DEATHS FROM PREVENTABLE DISEASES.

Approximately 40 per cent of the deaths occurring each year are the result of diseases that are usually classed as preventable, as shown

by Table VIII. If to this group there are added deaths from "external causes," including homicides and those resulting from other forms of violence, the proportion of preventable deaths will usually exceed 50 per cent of the deaths from all causes.

With an adequate division of communicable diseases it should be possible to markedly reduce this unnecessary loss of human lives every year. Special attention should be given to typhoid fever, the common diseases of childhood, pulmonary tuberculosis, the pneumonias, and the various causes of infant mortality.

TABLE VIII.—*Showing deaths from certain preventable causes, for the years 1910–1918, city of Memphis.*

Diseases.	1910	1911	1912	1913	1914	1915	1916	1917	1918	Total.
Typhoid fever	38	87	80	49	61	39	66	32	23	475
Malaria	102	119	108	90	79	96	60	45	44	743
Smallpox	.....	1	.....	.....	.....	.....	.....	.....	.....	1
Measles	1	9	1	4	6	1	.....	15	4	41
Scarlet fever	7	3	1	12	2	5	6	4	2	42
Whooping cough	4	19	6	13	10	.....	1	11	8	72
Diphtheria and croup	13	22	10	17	20	18	17	23	12	152
Influenza (grippe)	34	27	35	20	18	25	20	15	172	366
Dysentery	19	18	22	7	11	16	22	19	18	152
Septicemia	54	47	43	39	50	43	52	59	52	439
Tetanus	9	7	9	13	4	5	10	9	3	69
Pellagra	5	14	26	37	106	99	45	39	32	403
Tuberculosis (all forms)	351	325	349	335	434	416	390	409	407	3,416
Syphilis	7	23	24	15	33	28	31	22	29	212
Gonococcus infections	.....	1	.....	1	.....	.....	.....	.....	.....	2
Cerebrospinal meningitis	17	13	37	50	15	2	2	16	11	163
Bronchitis	36	39	35	24	19	16	16	24	26	235
Pneumonia (all forms)	265	280	261	246	260	247	177	350	824	2,910
Diarrhea and enteritis:										
Under 2 years	140	133	97	69	100	70	47	61	67	784
Over 2 years	21	39	39	31	40	41	19	28	36	294
Total deaths, all causes	2,818	2,833	2,979	2,758	2,989	2,900	2,643	2,958	3,563	.....
Deaths from preventable causes	1,123	1,226	1,183	1,072	1,268	1,167	981	1,181	1,770	.....
Per cent	39.9	43.3	39.7	38.8	35.7	40.2	37.1	39.9	49.7	.....

With the exception of the deaths from typhoid fever the figures in the above table were taken from annual reports of the health department.

EPIDEMIOLOGIC STUDY.

When cases of communicable diseases are fairly completely reported to the local health department and adequate records, tabulations, and spot maps are prepared and carefully and consistently studied, the health department is at all times in a position to know quite accurately the incidence and geographic distribution of the prevalent infections. Excessive endemic prevalence and mild outbreaks of communicable diseases will be detected.

This so-called epidemiologic study is a most important activity and it requires special training and practical experience. Successful control of communicable diseases depends upon the carrying out of such measures as may be decided upon after a careful study of the epidemiologic data assembled. Any other method or attempt to control any communicable disease is haphazard, unscientific, and

expensive, because much time and energy will be wasted, and the main factors responsible for the spread of a disease may be entirely overlooked.

As far as could be determined, there has been in Memphis very little attempt to conduct any epidemiologic studies of even the more prevalent diseases. Although a certain amount of data is collected on forms provided for such diseases as typhoid fever and tuberculosis, no practical use is made of this information. In the proposed reorganization of activities the activities of the division of communicable diseases must be carefully and thoroughly developed.

HEALTH ACTIVITIES OF NONOFFICIAL ORGANIZATIONS.

Reference has already been made to the financial aid extended by the city to the associated charities and the Public Health Nursing Association. These grants, if maintained at a similar scale in 1920, will amount to about $12,000. This sum is charged against the health department expenditures, and it is intended largely to relieve the city of further obligations concerned with the care of the indigent. The city exercises no supervision over the expenditure of these allotments, and while there is undoubtedly much good accomplished, it does not seem to constitute a good business policy on the part of the city government, and surely should not be made a charge against the health department budget.

While some of these nonofficial organizations are not concerned directly with public-health activities, a part of the work carried on by the Public Health Nursing Association is closely allied to the functions belonging to a municipal health department, and the Shelby County Tuberculosis Association concerns itself solely with the problem of tuberculosis.

The following report of the Public Health Nursing Association for the year 1919 indicates the activities and scope of work carried on by this organization. In addition to the officers and one director of nurses, there are employed four white and five colored nurses in the field and one nurse for office work.

Summary of report of Public Health Nursing Association, 1919 (exclusive of prenatal and infant welfare work).

Number of patients brought forward	97
Number of new patients	4,437
Number of patients still under care at end of year	364
Patients classified:	Patients.
Associated charities, 7,260 visits	1,389
Metropolitan Life Insurance Co., 12,950 visits	2,848
Home Service Section, American Red Cross, 248 visits	47
Western union	22

Patients classified—Continued.	Patients.
Pay service	12
Other	119
Clinic and other visits, 260.	
Absent, no illness, or not found, 240 visits.	
Diagnosis of dismissed cases:	
Typhoid fever	123
Influenza and la grippe	911
Malaria	99
Tuberculosis of lungs (positive)	71
Tuberculosis, other forms	11
Pellagra	13
Other general diseases	224
Cancer	25
Nervous system and organs of special sense	110
Circulatory system	69
Respiratory system, pneumonia, bronchitis, etc	318
Digestive system, diarrhea and enteritis	176
Other diseases	257
Genito-urinary system and adnexa	220
Puerperal state, puerperium	248
Other diseases	51
Skin and cellular tissue	44
Bones and organs of locomotion	5
Old age and senility	25
Affections produced by external causes	277
Not found	119
Ill-defined or undiagnosed	341
Classification of dismissed cases:	
Condition on discharge—	
Cured or improved	3,462
Unimproved	425
Dead	164
No illness, not found	119
Color and sex—	
White—	
Female	1,386
Male	651
Colored—	
Female	1,548
Male	466
Unknown	119
Discharged to—	
Dispensary	211
Hospital	188
Others	352
Family	3,124
Unknown	131

There should be developed and fostered a closer alliance between the health department and the several private organizations in order to bring about a uniform and consistent program of all public health activities and to utilize to best advantage all resources available for health work.

IV. Health Supervision of School Children.

The provision of a medical service for the physical examination of school children and the direct control of preventable communicable diseases in schools and for the remedial care and correction of certain physical defects which otherwise are so frequently neglected through ignorance, intention, or lack of financial resources should form a part of the public health program of every community.

MEDICAL INSPECTION OF SCHOOLS.

From 1908 to 1916 a force of part-time physicians was employed for the medical inspection of school children. In 1914 17 physicians and 4 nurses were engaged in this work. The medical force was reduced to 1 part-time physician with 12 nurses in 1917.

How valuable this service may have been can not be determined from the records and published reports. For example, in 1914 there were 18 physicians acting as medical inspectors, 4 out of a total of 34 schools were visited, and 6,073 physical examinations made out of a school enrollment of about 20,000 pupils.

In 1918 the following summary from the report of the chief school inspector, as published in the annual report of the health department for the year, indicates the general activities of this division, with a personnel of 1 medical inspector and 14 nurses:

Summary report of medical inspection of schools (1918).

Physical examinations made	13,967
Cultures taken	946
Vaccinations made	24
Rooms fumigated	16
Pupils readmitted	5,721
Pupils excluded:	
Communicable diseases	2,237
Cases not diagnosed	630
Exposure to contagious diseases	333
Excluded for vaccinations	1,521
Diseases or defects requiring treatment:	
Hypertrophied tonsils	3,446
Adenoids	1,168
Nasal catarrh	40
Malaria	32
Defective vision	380
Defective hearing	112
Defective speech	58
Defective teeth	4,826
Skin affections	94
Orthopedic	24
Backward children	52
Miscellaneous	3,263

Defects corrected:

Adenoids	190
Tonsils	215
Eyes, operations and treatments	33
Glasses fitted	28
Teeth filled	1,240
Ears treated	18
Ear operations	3
Miscellaneous	15

Although this report appears under the caption of "Medical inspection of schools," it was learned that it represented largely the activities of the health department nurses. The "physical examinations" were made usually by the nurses, and many of the pupils excluded because of communicable diseases were excluded as a result of notifications sent to the schools after reports of cases had been received by the health department.

PRESENT SCHOOL INSPECTION SERVICE.

At present there is no medical personnel engaged primarily for the health supervision of school children, the chief school inspector having been discontinued on March 1, 1920. There are on duty in the health department 18 nurses under the direction of one supervisor of nurses. Sixteen nurses are assigned to school work during the school year.

As the duties of these nurses are largely concerned with work in the schools for about 9 months of each year, the activities of the nursing corps will be considered here, previous mention having been made of their duties as public health nurses in connection with the general control of communicable diseases.

ACTIVITIES OF SCHOOL NURSES.

There is at present an enrollment of about 25,000 school children in 34 public schools. Each of the 16 nurses, including 4 colored nurses, are assigned to from 2 to 4 schools, giving each nurse supervision over approximately 1,500 pupils. They are on duty at the schools from 9 a. m. to 3 p. m. daily during the school year.

The routine work at the schools is as follows: Daily visits are made to all public and private schools in accordance to a daily schedule. Each room is inspected in turn and a short talk given to three rooms daily on personal hygiene, ventilation, and special health topics. Absentees returned to school are individually inspected. Swabs and temperatures are taken in suspicious cases of illness. This requires about one hour in each school. During these room inspections excludable conditions are noted and immediate action taken. Nonexcludable conditions are also noted and a printed

slip filled out for such defects or physical conditions as require special expert attention, this slip to be taken home to the parent and a copy of each notice retained by the nurse. Reports received by the school authorities or nurses giving names of school children coming from residences from which communicable diseases have been reported to the health department are acted upon and the children excluded if found in school.

Once during the school year each child is "examined" by a nurse and the findings recorded on a "physical record" card, which is filed at the school and follows the pupil through the eighth grade. This card gives a brief history of the occurrence of the more common infectious diseases and very briefly the results of the examinations made by the nurse, particularly as to defects in vision, hearing, breathing, tonsils, teeth, etc., and a record of height, weight, and mentality. Each nurse examines on an average about 20 pupils daily.

A printed form is provided for notification of the parents of such defects as require attention, and after 3 p. m. daily and during the summer, pupils with correctable defects are followed up to encourage and to arrange for remedial care.

Absentees that can not be accounted for are visited after school hours. There is obviously but little time left for this follow-up work during the school year.

Glasses have been provided for indigent pupils through a special fund made available by the Kings Daughters' Circle, and some dental attention has been secured for children at the fresh-air school.

The health department nurses wear no uniform and are not provided with nurses' bags. They have practically no literature for distribution. For field work they are allowed actual expense of transportation on street cars.

A "round table" talk is held by the supervisor of nurses once each week. Special papers are prepared by the nurses and from time to time a speaker is secured to address them on subjects of special interest. Each nurse keeps a daily record of work performed and submits a monthly report of all activities.

Parent-teachers associations hold monthly meetings at nearly all of the schools. Through these associations about 15 lunch rooms are operated.

SCHOOL SURVEY.

A survey of the public-school system of Memphis was made in 1919 by the Bureau of Education, Department of the Interior. The report of this survey[2] indicates that "approximately two-thirds of

[2] The Public School System of Memphis, Tenn., Bulletin, 1919, No. 50, pt. 7, Health Work. Department of the Interior, Bureau of Education. Government Printing Office, 1920.

them (school children) are 'normal' in the sense that they are free from defects and disabilities that will permanently handicap them or impede their growth or development." This report further states that "there are no records of the physical condition of the children in the Memphis public schools."

SCOPE AND REQUIREMENTS OF SCHOOL MEDICAL INSPECTION.

In order to properly promote the health of school children, provisions should be made for maintaining thorough sanitation of all school buildings and the necessary supervision over all classrooms in order to prevent conditions injurious to health; full-time medical inspectors qualified to carry out the necessary sanitary and medical supervision; full-time school nurses; ample facilities for dental inspection; gratuitous treatment, when necessary, for conditions that otherwise would be neglected; and thorough mental examinations of pupils who fail to show normal progress in their educational development.

The medical inspection of schools should constitute an activity functioning with and under the direct supervision and direction of the health department, as a division of its organization. Its scope of operations should include examinations for physical or mental defects, including dentition, hearing, vision, posture, and other abnormalities which influence physical or mental development. Parents should be notified of such defects or conditions as require remedial attention and encouraged to secure the necessary treatment.

Thorough medical and physical examinations should be made of all children upon entrance to schools and the findings noted on a suitable blank form which should be properly indexed and follow the pupil through the grades. Subsequent examinations will frequently be necessary, and the results should be entered on the physical records.

The medical inspector or school physician should devote his full time to his official duties and be qualified by training and experience to perform this important public function. The school nurse should be directly responsible to the school physician. In addition to assisting him in the schools, she should visit the parents of children excluded or absent on account of sickness or other condition and as a public health nurse instruct them in measures for the care of sick and prevention of disease. She should follow up all cases recommended for treatment and arrange if necessary for proper attention. Visits should also be made to the homes of pupils absent longer than three days for unknown causes in order to ascertain the reasons for absence and the possible existence of communicable diseases. When the school year has closed the school nurse should be assigned to infant welfare work or some public health nursing activity.

In the health supervision of school children there is a line of cleavage between functions that are medical and those that are purely educational, and hence incumbent upon the educational authorities. A department of school hygiene is becoming recognized as an important division of our educational system. Many of the disabilities of heredity or neglect can be readily detected and many of these deficiencies can often be corrected by proper instruction and training. Such activities as are purely medical or aimed at supervision over the health of the child, including measures for the control of communicable diseases, should be placed under the direct authority of the health department.

To place the entire responsibility for all activities required for adequate supervision of the health of school children in Memphis under the administration of the health department would necessitate a considerable increase in the present personnel and budget. The recommendations that will be made for the development of a bureau of medical inspection of schools to meet present requirements and conditions will therefore be conditioned upon the establishment of a department of school hygiene under the board of education.

V. Chemical and Bacteriological Laboratory.

Reference has already been made to the diagnostic work carried on by the health department laboratory. In addition to this function, there must be considered the other activities undertaken under the direction of the city chemist. These include the enforcement of the pure-food laws, control over the production and handling of milk and other foodstuffs, the preparation of narcotic solutions for the antinarcotic dispensary, and bacteriological examinations of drinking water.

Personnel and equipment.

The position of city chemist is provided for by ordinance, and his salary is fixed at $2,400 per annum. The present incumbent has held this position since 1914. In addition to assuming charge of the laboratory he has direct supervision over the milk and meat inspectors.

There are at present on duty in the laboratory one assistant or technician, one clerk whose salary is paid out of receipts for the sale of narcotics, and one colored maid, who cleans glassware, acts as messenger, and performs other similar duties.

The laboratory occupies two fair-sized rooms, and the present equipment is reasonably adequate for the character and amount of work undertaken. When new quarters are provided for the health

department, occasion should be taken to renew part of the old equipment and to purchase some more modern apparatus in order to extend the facilities for diagnostic work.

Laboratory records are not as complete and satisfactory as they should be, in some instances only the rough bench sheets being filed for future reference.

On the whole the laboratory division shows more competent and conscientious management than other divisions of the health department. Too many functions, however, have been imposed upon the director of the laboratory.

ENFORCEMENT OF PURE FOOD ORDINANCE.

The enforcement of the pure food ordinance is placed under the supervision of the city chemist. Samples of various foodstuffs collected by the milk, meat, and food inspectors are examined by the city chemist for misbranding and tested for adulteration and wholesomeness.

The pure food ordinance in force March 24, 1908, is fairly comprehensive. The essential provisions have been abstracted and will appear in the appendix.

In 1918, 2,110 miscellaneous samples of various foods and beverages were examined. A considerable number of violations of the ordinance are found each year and the majority of these offenders are fined by the courts.

BACTERIOLOGICAL EXAMINATIONS OF WATER SUPPLIES.

Prior to the typhoid epidemic of 1919, bacteriological examinations had been made of the city water supply on an average of once or twice each week. Although the results of these examinations have not been published by the health department, the total bacterial counts on agar after incubation at 37° C. have been very low, probably not over 4 per cubic centimeter, and it is reported that gas was never found in lactose bouillon fermentation media in 1 cubic centimeter samples.

Subsequent to the 1919 epidemic, daily (six times each week) examinations of two samples of the public water supply have been made at the health department laboratory. As a routine, only the total bacterial count on agar is undertaken, as "*B. coli* is never found in 1 cubic centimeter samples." The total counts have varied from zero to four or five for each sample. This is the only bacteriological control maintained over the city water supplies. A daily report of the findings is given to the water department.

Further discussion of this subject will be found under the section dealing with water supplies.

Occasionally, bacteriological examinations of samples of water from private water supplies are made, and in the past a number of polluted sources have been abandoned.

ANTINARCOTIC DISPENSARY.

In October, 1919, an antinarcotic dispensary was established at the police station in order to attempt a better control over drug addicts and "boot-legging." A physician on part-time service is employed and his salary—$50 per month—is paid out of the receipts for the sale of narcotics. A social worker is also on duty, her salary also paid from this fund.

Morphine sulphate, in sterile solution, is prepared in the health department laboratory and dispensed in small vials by the physician in charge of the dispensary. A charge of 5 cents per grain of the drug is collected and deposited with the city chemist, who is charged with the accounting and expenditure of this fund. About 26,000 grains of morphine sulphate have been sold in this way each month.

The preparation of solutions, washing and sterilizing glassware, dispensing, and accounting have occupied considerable time and under present conditions, with inadequate personnel, distracts the laboratory from more important activities. If this so-called "antinarcotic dispensary" is continued, it should be divorced from the health department or ample provision made for its continuance. It might preferably be conducted as a branch service at the city hospital.

VI. Control of Food Supplies.

Although meat and food inspection is conducted under the direct supervision of the city chemist, as required by city ordinance, these activities will be considered separately.

The city "meat inspector" receives a salary of $125 and an allowance of $3 per month for transportation. He "inspects" all meat products shipped into the city and collects a "fee" of $2 per carload shipment from the consignees. These products have previously passed inspection and bear the Government stamp. This so-called inspection seems to be a more or less perfunctory activity, and to secure the full salary of $1,500 per annum it is necessary to collect at least that amount in fees. From $200 to $300 is collected each month and deposited with the city treasury.

The "city meat inspector" also inspects domestic meat products, affixes the official stamp, and collects certain fixed fees.

One additional meat inspector is employed. He is on duty each morning at the market house, where he inspects and stamps most of the meat product slaughtered locally because of the fact that no fee

is charged for his services. In the afternoon he visits local abattoirs and slaughterhouses.

In 1918, 14,796,645 pounds of cold storage and 2,638,251 pounds of domestic meats and meat products were inspected and a total of 601,488 pounds condemned and destroyed. There is evidently need for continual supervision over the quality of these products offered for sale.

As will be indicated later, the city chemist should be relieved of the supervision over this division of health department functions and meat inspection placed in a newly organized division.

CONTROL OF FOOD-HANDLING ESTABLISHMENTS.

Three food inspectors, under the direction of the city chemist, are employed for the inspection and control of eating places and food-handling establishments. The city is divided into three districts, north, center, and south, and one inspector is detailed to each district. These inspectors are paid salaries of $100 per month, and in addition allowed from $3 to $4 each month for street car fares.

In the central district a female inspector is assigned, and particular attention is given to places where women and girls are employed.

Daily inspections are made of all groceries, markets, bakeries, eating places, and all establishments where food is prepared or handled. Daily reports of these inspections are turned in to the city chemist.

In 1918, 37,961 "inspections" were made by the three inspectors, and while it was stated that it had been possible to bring about considerable improvement in the sanitary condition of food-handling establishments, personal vists to many of these places indicates that much remains to be accomplished.

SODA FOUNTAINS.

The majority of the soda fountains and soft-drink stores are operating with inadequate facilities for the sterilization of glassware and other eating utensils, and individual service with paper cups is the exception rather than the rule. In many of these places there is really no sterilization attempted, the glasses, spoons, etc., being merely rinsed more or less effectively, very often in cold running water.

EATING PLACES.

There was little evidence of health department supervision over the operations of eating places in general, and many of the smaller lower-grade restaurants appeared rather dirty, dingy, and smelly, with inadequate facilities for the proper sterilization of eating utensils.

SIDEWALK DISPLAYS.

Fruits and vegetables are openly exposed on sidewalks and in many booths and stands, although the city ordinances prohibit these sidewalk displays unless the foodstuffs are "perfectly protected by a suitable covering as authorized by the board of health." Strawberries and other foods were found directly on the sidewalk and readily accessible to the nuisances so commonly committed by stray dogs. Nowhere was any real attempt made to protect these displays from street dust and dirt or from promiscuous handling.

Any statement to the effect that such an exposure of fruits and other foodstuffs constitutes a definite health menace or that it contributes in some measure at least to the spread of disease might be challenged. The practice is surely unsightly and can not be considered a desirable method of handling foodstuffs. That it is unnecessary is shown by a brief survey of Mississippi cities where sidewalk displays are prohibited by State regulation without apparently working any hardships upon the vendors or the public.

In the general clean-up of this practice of street vending there should be included the sale of tamales, wienerwursts, ice cream, candy, cracked pecans, and other wares usually sold from small pushcarts or stands. The personal cleanliness and hygiene of the dispensers of these articles of food, methods of handling, and the sanitary conditions usually existing at the places where they are prepared are sufficient arguments to condemn the practice.

SANITARY CONTROL TO BE EXTENDED.

The present personnel and methods are inadequate to properly control and supervise the sanitary operation of public eating places and the preparation and handling of foodstuffs in general. The development of a system of grading or scoring these establishments and utilizing these ratings as a stimulus to encourage further improvements would undoubtedly bring about better sanitary conditions and more acceptable methods of preparation and handling. Publication of the grades or scores in the daily press not only informs the general public of the relative status of these establishments, but reacts favorably upon the dealers maintaining the higher grades.

Provision should be made for some sort of supervision over the health of those employed in food establishments in order to eliminate those suffering from communicable diseases. The physical condition of employees should be considered in establishing the grades or scores given.

VII. Control of Milk Supplies.

Supervision over all milk and milk products is also placed under the direction of the city chemist. Routine measures are carried on under two divisions, known as dairy inspection and milk inspection. There is at present one dairy and one milk inspector. A veterinarian was employed until October, 1919, at a salary of $125 per month, and it is expected to fill this position in the near future.

Ordinances regulating the handling and sale of milk within the city were revised in 1918 and in general provide for rather satisfactory control by the health department. An abstract of these ordinances is given in the appendix.

DAIRY INSPECTION.

One dairy inspector is employed at a monthly salary of $100. He is provided with a two-passenger automobile and given police power. He is in reality a part-time employee, being engaged in private enterprise and having had no previous training or experience in dairy inspection.

Frequent inspections are made of all producing dairies within a radius of from 15 to 20 miles in the States of Tennessee and Mississippi. On January 1, 1920, 320 dairies were listed, and about 275 of these are visited by the local inspector.

The dairy inspector also visits the local milk depots and pasteurizing plants. In these inspections there is no attempt to rule with an arbitrary power except after repeated violations or willful contempt for the requirements of the ordinances. It has required constant watchfulness, however, to keep some of the dealers within reasonable bounds.

The following summary of work performed in 1918 gives an indication of the general activities of this division:

Dairy inspections, 1918.

Dairies listed	234
Dairies inspected	2,591
City milk rooms inspected	43
Notices sent to make sanitary improvements	29
Dairies temporarily excluded account insanitary conditions	1
Permits revoked	3
Dairies quarantined account of anthrax on premises	4
Dairies quarantined account of diphtheria on premises	1
New cow barns	5
New milk houses	6
New wells	2
Number of head tuberculin tested	1,521
Number of reactors	66
Number of cattle testing suspicious	28

Number of reactors on retest	1
Retest of suspicious reactor (healthy)	1
Dairymen interviewed on improving dairies	209
Milk samples from 5 herds	50
Number of cows excluded from herds	74
Persons from 54 retail dairies vaccinated against typhoid	241

The tuberculin test.—The principal duty of the veterinarian is the tuberculin testing of the herds producing milk sold in the city. The testing of cattle for tuberculosis is also being carried on by a representative of the Bureau of Animal Industry, United States Department of Agriculture. Attention has been given for a number of years to the elimination of tuberculosis from milch cows in this section. During the four years 1915–1918, 9,454 cows were tested and approximately 4 per cent were found to be "reactors." The city ordinance requires that all milch cows be tuberculin tested at least once in each 12 months, and this has apparently been fairly effectively enforced.

Sources of supply.—With the exception of the supply handled by the largest distributor, most of the milk sold in Memphis is produced within a radius of about 20 miles of the city. Milk is shipped in from various points in Arkansas and Illinois, and the bulk of this milk is said to be pasteurized before shipment. There is practically no direct control of this production by the local authorities and no record of the total quantity sold in the city or the amounts produced at the various dairies.

Permits and scores.—Every dealer who sells milk for distribution in the city is required to file an application with the health department, giving certain general information concerning the dairy and the herd. Before a permit is issued an inspection is made by the dairy inspector, who scores the dairies, and if satisfactory and approved by him a permit for a period of one year is issued by the superintendent of health, countersigned by the city chemist.

The scores given are based upon the inspector's judgment of conditions found, the relative weights of the several factors considered having been fixed in accordance with a system devised by the city chemist. About 75 per cent of the dairies scored have been rated at 70 or above. Each dairy among those visited by the local inspector is rated usually once each month, and the inspection and rating of from 8 to 10 dairies constitutes an average day's work.

A daily report on a printed form is rendered to the city chemist, who keeps an "office record" of each dairy, showing sanitary conditions and scores and the results of bacteriological and chemical examinations made. A written notice is served when violations of ordinances are found and not immediately corrected.

When a case of a communicable disease occurs on a dairy, the county authorities are said to promptly notify the city health de-

partment, and at the same time to take the necessary steps to safeguard the milk produced at such a dairy. The city dairy inspector also visits the dairy and satisfies himself that there is no risk of infecting the milk sold or discontinues its sale.

MILK INSPECTION.

One "milk inspector" is employed at a salary of $100 per month, and he is provided with a roadster and its upkeep and given police authority. His principal activity is the collection of samples of milk and milk products from delivery wagons. It was stated that an average of 10 samples were collected daily for laboratory examination. Samples for butter-fat determinations are taken in half-pint bottles, which are sealed immediately after collection by passing a wire through the cork and the neck of the bottle, the ends being sealed with lead, the seal bearing an identification number. One of the samples so collected is given to the driver if he so desires it.

In the summer months samples are collected from the wagons for bacteriological examination. For this purpose 15 cubic centimeters of milk are collected with a sterile pipette and placed in a sterile bottle. A refrigerated compartment carrying case is used to store these samples until they reach the laboratory.

LABORATORY EXAMINATIONS.

In addition to the examination of samples of milk, cream, and other milk products for fats and other solids, bacteriological examinations of about 10 samples are made daily during the summer months. Because of the prosecutions secured as a result of these examinations, the average bacterial content of the city supply has been considerably reduced. In 1919 there were 119 prosecutions for various violations of the milk ordinance and $2,215 assessed in fines.

In 1919 the average bacterial count of all samples examined was slightly over 500,000 bacteria per cubic centimeter. Exceptionally high counts are at once investigated by the dairy inspector in order to correct faulty methods of production or handling.

In 1918 the results of these examinations were posted on a bulletin board at the laboratory and the press published the total counts, but refused to include the names of the producers. This publicity has not been attempted since that year, although the milk ordinance provides that the names, scores, and other data concerning each dealer shall be published each month in the daily newspapers.

GRADES OF MILK ESTABLISHED.

The milk ordinance provides for the following grades of milk: Certified; grade A, raw and pasteurized; grade B, raw and pasteurized. The requirements of these grades are indicated in the appendix.

With the exception of about 175 gallons of raw milk sold as "certified" milk, all milk sold in the city is rated as grade B milk. To meet the requirements of grade A would necessitate the installation of facilities for steam sterilization of all utensils, a sanitary score of at least 70 for the raw and 90 for pasteurized products, clarification, and a maximum bacterial count of not over 100,000 bacteria per cubic centimeter at time of delivery. It would be difficult if not impossible at present for many of the grade B supplies to meet these requirements, and dealers are satisfied to be rated at the lower grade.

"CERTIFIED" MILK.

The term "certified," as applied to milk, was adopted by the American Association of Medical Milk Commissions and certain standards and methods[3] for the production and distribution of certified milk were agreed upon and published for the guidance of local medical milk commissions.

Certified milk is designed to meet the requirements of a safe, pure raw milk, suitable for infant feeding. In accordance with the standards referred to, this milk must be "certified" by a medical milk commission appointed by a representative medical society. The local commission is required to provide for the necessary control and supervision over (1) the hygiene of the dairy as it relates to the production and distribution of the milk; (2) the veterinary supervision of the herd; (3) the medical supervision of the employees; and (4) the chemical and bacteriological examinations of the milk. After careful investigation by the commission, a written agreement is entered into with the dairyman desiring to produce certified milk. He is then authorized and required to label his product as "certified," giving the name of the medical milk commission so certifying and the day or date the milk was produced.

The standards and requirements adopted by the American Association are necessarily rigid and comprehensive, and local medical milk commissions must accept these standards as minimum requirements.

The Lem Banks "Certified" Dairy.—About six years ago the medical milk commission created by the Shelby County Medical Society "certified" the plant known as the Lem Banks Dairy. This dairy is located at Raines, Tenn., about 10 miles from Memphis. The standards of the American Association of Medical Milk Commissioners were adopted, and for the first time in this city milk of a "certified" quality was available. This milk is distributed by the Clover Farm Dairy and retails at present for 25 cents per quart.

[3] Methods and Standards for the Production and Distribution of "Certified Milk." Adopted by the American Association of Medical Milk Commissions, May 1, 1912, Reprint No. 85, Public Health Reports, 1912.

During the present survey a visit to this dairy was made by the writer in company with the dairy inspector. The following comment is made without attempting to give any detailed description of the conditions found. From observations made and information secured from the resident manager of this dairy, it is evident that nearly all of the important standards and methods of certified milk production are honored largely in the breach, and various excuses were offered by the manager for the faulty conditions found at the time of the visit.

Among some of the grosser violations of the standard requirements there may be noted the following: Manure was being stored directly outside the stable; feed was kept in small partitioned rooms at the end of the stable; milking clothes are not provided and have not been used for some time; the dairy building or milk house is directly connected with the stable.

It was learned that in order to augment the present daily production of about 150 gallons an average of 30 gallons was received from a near-by dairy and dispensed under the same label as "certified" milk. The entire output of this other producer is handled by the Banks Dairy, that not labeled as certified being hauled to the Clover Farm plant for pasteurization.

No provisions have been made for supervision over the medical examinations of employees; in fact, any special attempt at regulation has only served to increase the labor turnover.

Samples of this certified milk have been collected and examined at the health department laboratory. No other examinations have been made, officially, at least. From January 1, 1919, to March 31, 1920, 311 samples were examined, and 128, or slightly over 41 per cent of these samples, gave total counts of over 10,000 bacteria per cubic centimeter on agar at 37° C., 13 having total counts of over 100,000 bacteria per cubic centimeter. When it is considered that the maximum bacterial count allowed for certified milk is 10,000 per cubic centimeter, it is evident that this supply has failed to reach the consumer with as low a bacterial content as should be expected.

Upon further inquiry it was learned that this supply has not been "certified" by the local medical milk commission for several years, due to the fact that the dairy could not or had failed to meet the requirements.

Although this supply is probably reasonably safe the greater part of the time, its continued sale as a "certified" product violates all requirements of certified standards. It is obviously "mislabeled" and does not conform to the terms of grading provided in the city milk ordinance. In justice to other dealers and to maintain the high standards of truly certified milk, this dairy should be prohibited

from marketing its product under the present label until it can again be certified.

GRADE B, RAW AND PASTEURIZED.

It was not possible to determine even approximately the average daily quantity of milk distributed in the city. As previously stated, there is no grade A milk sold as such. As nearly as could be determined, about 75 per cent of the milk sold by regular distributors is pasteurized grade B; the balance falling into grade B, raw.

Pasteurization.—Three of the larger dealers handle about 6,000 gallons of pasteurized products daily, and it was estimated that this represents about 75 per cent of the total supply.

The Clover Farm Dairy, by far the largest dealer, distributes from 4,000 to 5,000 gallons daily. This entire output is pasteurized locally, and a brief survey of the plant indicates that reasonable care is being taken and that the equipment is quite satisfactory. The holding method of pasteurization is used and automatic temperature recorders are installed.

One dealer, handling about 800 gallons of milk and milk products daily, operates a batch pasteurizer, heated with a revolving steam coil. The temperature to which the product is heated is recorded on a thermometer inserted in the end of the vat at a point not readily accessible for reading. The rating of this establishment is doubtful, and the milk inspector has been compelled to threaten closure in order to correct faulty methods and insanitary practices. Pasteurized grade B milk, buttermilk, and "reconstituted" milk are sold by this dealer.

One other dealer, whose total daily output is about 600 gallons, pasteurizes by means of the heating vat used in the reconstruction of milk. New equipment was being installed in new quarters, and it is doubtful if all the output of this dealer was being pasteurized.

The Gayosa Farms Dairy supplies all milk and milk products used by the three large hotels in the city. This dairy produces from 75 to 150 gallons, and buys of small dairies from 400 to 600 gallons daily. It was stated that all the bought milk was pasteurized, and the entire supply so treated during the summer months. This dairy would probably receive a very satisfactory rating on the usual score card.

RECONSTITUTED MILK AND OTHER MILK PRODUCTS.

There are three plants in the city manufacturing "reconstituted" milk, cream, and buttermilk. Part of this product is sold as whole milk and is supposed to be labeled as such. In the manufacture of this product milk powder and unsalted butter are mixed in varying percentages, heated and passed through an emulsifier. A consider-

able amount of reconstituted "cream" is sold to ice cream manufacturers.

Large quantities of buttermilk are prepared and sold. A part of this supply is made artifically from dried milk powder.

CONDITION OF DAIRIES AND DEPOTS.

A survey of representative producing dairies was made in company with the local dairy inspector. While the equipment at many and perhaps the majority of the smaller dairies is far from ideal, yet it would be possible to produce and distribute milk of a very satisfactory quality provided reasonably efficient methods of handling were adopted and practiced. Cow stables were generally clean and the majority have concrete floors. Milk houses are often crude structures, but many of them are used only for storing milk in cans for cooling purposes before delivery. In summer months facilities for proper refrigeration are often inadequate.

It will require constant supervision over methods of production and handling in order to secure for the consumer a milk supply of a satisfactory sanitary quality as determined by bacterial content. The present personnel engaged in the control over this important foodstuff is inadequate. Repeated legal prosecutions indicate the tendency to violation of the ordinances, and while court action and fines no doubt stimulate some of the dealers to adopt better methods, supervision and control over the milk supply should be extended.

Under present conditions it seems advisable to organize and develop a bureau of milk and food inspection to be operated under the direction of an officer who has had special training or experience in this branch of health department work.

The food value of milk and the importance of an adequate supply of pure, safe milk, especially for infant feeding, can not be too strongly emphasized. The present control exercised over the production, handling, and distribution of milk is inadequate, and the sanitary quality of a considerable portion of the total daily consumption is regarded as doubtful or suspicious.

PRIVATE COWS.

It was stated that there are probably 2,000 private cows stabled within the city limits, and although the owners are required to obtain a privilege permit from the health department there is practically no supervision or control over these sources of supply.

VIII. Division of Sanitary Inspection.

Under the direction of a chief sanitary inspector there are employed at present 14 sanitary inspectors. These men are given

police authority and in reality constitute a sanitary police force. The majority wear uniforms. Many of these officers have been on duty for many years and have undoubtedly been appointed without any special qualifications. An impartial judgment would give a very low rating to the efficiency of this division. The present chief sanitary inspector has served for over 20 years, and his activities have been determined largely by political interference.

All sanitary inspectors are required to report at the office at 8 a. m. for instructions. The city has been divided into districts and each inspector is responsible for his district. As a check, they are required to phone in to the office at 11.45, 1, and 4.40 each day.

While there are certain routine duties performed by this force, the division of sanitary inspection has been a sort of dumping ground or clearing house for all sorts of complaints and nuisances. Although the collection and disposal of garbage, refuse, and night soil has recently been transferred to the engineering department, final agreement as to what department shall maintain supervision over the storage of garbage on premises and the sanitary condition of privies and yard closets does not seem to have been reached.

COMPLAINTS.

"Complaints" of nuisances of all sorts, received by phone or otherwise, are entered upon a blank form at the office. The chief sanitary inspector transfers these to a "complaint" blank and gives them to the proper inspector for action. Verbal orders are usually given to discontinue or abate the nuisance and when this fails to correct the condition a written notice is served. If no action is secured by this means, a warrant for arrest is served for appearance before the judge of the city court. A considerable number of such arrests are made and fines assessed.

A number of complaints are received in writing by reference from the chief of police and fire department. In many instances these are purely public nuisances and should be abated by proper action by these other departments.

ANNUAL INSPECTION.

Beginning about April 1 each year a house-to-house survey is made and conditions noted on a special survey form. From 25 to 50 or more premises are inspected daily by each officer and the survey is completed in from one to three months. These survey notes are filed and apparently no special use made of them. It was not possible to determine from these records the total number of privies in use, due to the fact that data is often incomplete and uncertain. There is no spot map or list of privies or other important nuisances.

OTHER ACTIVITIES.

Written notices requiring connections to city sewers, prepared by the plumbing inspector, are served by the sanitary inspectors. Reports of leaking water or sewer pipes or mains are referred to the proper departments. One inspector is assigned to the placarding of communicable diseases and the serving of vaccination notices. Permits are issued for keeping cows within the city limits, but there is no record of the total number of these private cows. Barber shops were recently visited, 17 arrests made and 7 fines assessed for violations of the city ordinances governing these establishments.

RÉSUMÉ.

The summary of all activities of this division, prepared by the chief sanitary inspector for the annual report of the health department for the year 1919, is compiled from the daily and monthly reports of the sanitary inspectors. Similar reports have been published each year.

Annual report, division of sanitary inspection, 1919.

Houses inspected	146,822
Cleaned	4,021
Yards inspected	121,083
Cleaned	6,660
Water-closets inspected	119,395
Cleaned	4,722
Earth closets inspected	5,067
Cleaned	2,800
Cellars inspected	9,245
Cleaned	1,301
Cisterns inspected	613
Oiled	11
Filled	25
Wells inspected	2,948
Cleaned	33
Filled	1
Stables inspected	8,934
Cleaned	2,211
Alleys inspected	10,076
Cleaned	2,604
Ponds inspected	187
Cleaned	33
Oiled	10
Water samples collected	107
Sewer connections ordered	214
Sewer connections made	181
Plumbing reconstructed	1,608
Other nuisances abated	15,427

Warrants issued	75
Warrants served	85
Special instructions	6,084
Notices to abate nuisance	15,882
Closets unstopped	2,151
Premises' water turned on	952
Posted and removed placards for contagious diseases	4,212
Notified parties where tuberculosis had been to come to clinic	3,400
Smallpox notices served	2,000

Made inspection in new annex, territory of Binghampton, and I find that they have 325 sewers connected with water and 362 earth closets. Just as far as I have made inspections I find them in fair condition. I have had 3,650 complaints in regard to water pipes, closets stopped, and sewers choked; and ashes and garbage, also grass and weeds.

I have reported to water company 265 leaks in streets and alleys.

Out of the 34 schools in the city they have all been inspected in regards to drinking fountains and water supplies, also sanitary conditions, and found them in best of condition.

Arrests made for violating sanitary laws and fined in police court, $375. I have reported to Sanitary Reduction Co. dead stock, 79 head.

CHIEF SANITARY INSPECTOR.

The above summary indicates an average of from 40 to 50 or more inspections or actions daily for each inspector or from 6 to 8 per working hour, at cost to the city of over $17,000 per annum. It has not been possible to discover much value received from such an expenditure. A survey of the existing conditions in nearly all parts of the city fails to find any tangible or visible evidence of the influence of such an inspection service.

The health department is still responsible for the general sanitary condition of the city and is charged with the supervision over the construction and maintenance of yard closets and privies. Not one of the hundred or more privies and yard closets seen by the writer could be called sanitary by any stretch of the sanitary conscience, nor was there any evidence of any active supervision over these dangerous sources of infection.

Although the health department should undoubtedly be held responsible for and be charged with the supervision over health hazards and insanitary conditions and practices in general, an equitable division among the several municipal departments of the supervision required to prevent and abate many of the so-called nuisances now thrown upon the health department would relieve this department of many duties of no public health importance.

In the plan of reorganization proposed as a result of the present survey, recommendations will be made that the department of streets, bridges, and sewers, now responsible for the collection and disposal of garbage, refuse and night soil, be provided with an adequate inspection service to enable it to exercise all necessary supervision and

control over the storage of all refuse on premises, including the condition of streets and alleys and the maintenance of privies and yard closets. There must of necessity be close cooperation and coordination between this department and the health department.

In the same manner the abatement of many of the ordinary nuisances reported to the health department is properly a function of the police and fire departments. If these nuisances are successfully handled by the police, the energy of the health department can be expended in the control and correction of other conditions of far greater importance in promoting the general healthfulness of the city.

HOUSING CONDITIONS.

It would require a far more intensive study than seemed warranted during the present survey in order to determine the bearing of housing conditions upon the morbidity or mortality rates of tuberculosis or other contact infections. Having in mind the close relation between overcrowding, inadequate ventilation, unhygienic surroundings, and similar conditions upon the incidence of tuberculosis, the excessive death rate from this infection points strongly to the existence of such conditions in Memphis.

Before estimating the degree of overcrowding or the percentage of dwellings unsuited for human habitation, a careful house-to-house survey would be necessary. Approximately 40 per cent of the total population are colored. A smaller percentage, perhaps 10 per cent, of the white population are living under poor hygienic conditions. It is believed that at least 25 per cent of the total population are living under conditions that are detrimental to health.

Visits to many sections of the city revealed the fact that Memphis has indeed its "housing problem." A large proportion of the colored population are housed in buildings that should at once be condemned and vacated. Many of the others need extensive improvements. The more wretched types of dwellings occupy the low "bottoms" along the bayous and the more undesirable areas. They are found in nearly all wards. Aside from all grades of unhygienic environments, practically all of the poorer dwellings are provided with an insanitary type of "yard closet" or privy for the disposal of human excreta.

The fact that these undesirable areas are scattered over practically the entire city, even in the best residential wards, makes the problem a city-wide one, and the prevalence of preventable diseases among this class of poorly housed population undoubtedly influences the morbidity and mortality among the well-to-do and those enjoying good homes. Municipal authorities are beginning to realize that improved conditions and lowered sickness rates among the colored

and poorer classes means less sickness and fewer deaths among the more favored classes.

There is at present practically no effective control or supervision maintained over housing conditions. The present building code needs study and revision, and the organization of a division of housing and sanitation in the health department is urgently needed in order to determine the most practicable means of solving this difficult problem. Present conditions can not be corrected overnight. They will require careful study and a firm and determined policy on the part of the municipal authorities.

IX. Sanitary Engineering Activities.

The position of sanitary engineer has never been included in the organization of the health department in Memphis. Measures for the eradication of malarial mosquitoes, the control of private wells and water supplies, housing conditions and that large popularized group of conditions called "nuisances," all require the experienced judgment and decision of a public official who should preferably possess the qualifications of a sanitary engineer.

Memphis has all these problems and most of them are vitally concerned as factors contributing to a high general death rate.

The public water supply is placed in charge of the water department, a division of the municipal department of public utilities, grounds, and buildings. Supervision over the numerous private wells and other private water supplies is left to the health department.

The public sewerage system is maintained and operated by the department of streets, bridges, and sewers. The plumbing inspector it attached to this department and given supervision over the installation, alteration, or repair of all plumbing and drainage systems, including "yard closets," and the enforcement of the plumbing ordinances.

The collection and disposal of garbage, refuse, and night soil is also a function of the department of streets, bridges, and sewers. This department at present has no inspection service to enable it to maintain any supervision over the storage of these domestic wastes prior to collection. Such supervision as has been maintained has been carried on by the health department.

Although the public water supply and sewerage systems and the collection of municipal and domestic wastes have been delegated to other departments of the city government, these items will be briefly reviewed in order to discuss their bearings upon the public health. In the chapter on recommendations offered for a reorganization of health department activities a somewhat radical departure from the present assignments of municipal activities will be offered.

At least two epidemics of typhoid fever in Memphis have been attributed directly to gross pollution of the public water supply. The epidemic in 1911 may also have been due to this same cause, although there are no epidemiologic records covering this epidemic. If this public supply is liable to sudden gross pollution, the question naturally presents itself—can dangerous contamination take place from time to time, in a lesser degree, without being recognized?

A study of the curve of mortality from typhoid fever already presented does not indicate that the public water supply has been any considerable factor in the typhoid incidence in Memphis. A knowledge of the physical features associated with the collection system of this supply, however, raises a question of grave doubt as to whether it can be considered safe for drinking purposes under present conditions without additional safeguards or treatment.

The growth of the city is already taxing the capacity of the present supply, and this fact, together with the absence of storage facilities, has been responsible for increasing rates on fire insurance. With a view of remedying these conditions, a consulting engineer has been employed by the city for the purpose of further developing the system and increasing its capacity.

The following brief description of this supply is presented in order to point out certain features that, it is believed, constitute a definite health hazard and which must be recognized and remedied so as to avoid such public disasters as have already been experienced.

Source of supply.—Memphis is said to be the largest city in the United States taking its public water supply from artesian wells. Underlying a large area of Tennessee, Arkansas, and Mississippi is a deep water-bearing sand, geologically known as the La Grange sands. These artesian sands have a thickness of from 700 to 800 feet, and at Memphis are overlaid by about 300 feet of stiff blue clay interrupted with two 10-foot layers of sand and gravel. This water-bearing sand outcrops many miles to the north and east of Memphis, and the water, collected from large infiltration areas, reaches the city after extensive filtration under natural conditions through enormous layers of sand.

Such a source of supply is undoubtedly safe, unless it is artificially contaminated at or near the city through some puncture of the protecting clay stratum. This possibility is probably remote.

Collection systems.—In 1874, a private company installed a plant and delivered water from the Wolff River. The present well system was first developed in 1888. The city purchased the works in 1903. At present, the entire city supply is collected from drilled wells, the depth varying from 400 to 600 feet. Most of the wells are 10 inches

in diameter, water entering through 50-foot Cook strainers. About 180 wells have been drilled since 1888, and of these, about 60 are now in use. When the yield falls too low, due to clogging, wells are abandoned and the casings are filled with cement. The wells are located in city streets or alleys.

Three separate systems or plants are in operation—(1) Auction Avenue plant, (2) Central Avenue plant, and (3) the so-called segregated wells. Each plant delivers water to the general system of mains so that, although the original source of water is the same, any contamination of one of the three collection systems may reach practically all parts of the city.

1. Auction Avenue plant.—This represents the original plant and at the present time supplies from 50 to 60 per cent of the total daily consumption. About 40 wells are now in use. In order to prevent surface pollution from reaching the water-bearing level, an outside casing has been driven down around the well casing. These outside casings extend to various depths and there is doubt as to the tightness of the joints made in the clay at the lower ends.

Water from these wells flows by gravity into masonry tunnels which are located in the clay stratum about 90 feet below the ground level. The wells are connected with two tunnels by "drifts" about 24 inches square, lined with ship-lapped plank. The tunnels are 5 and 6 feet. respectively, in diameter and the total length of drifts and tunnels is said to be about 20 miles. Water from the tunnels flows to a wet well constructed of masonry 10 feet in diameter and located at the plant.

Three Worthington compound, condensing, vertical steam pumps, of a daily capacity of 10,000,000 gallons each, are in use and pump the water from the wet well directly to the supply mains under an average pressure of about 50 pounds. The minimum output from this plant is given as 10,000,000 gallons daily.

The drift and tunnel features of this system are believed to constitute a decided hazard and are directly responsible for the contamination of the supply which caused the typhoid fever epidemics in 1912 and 1919. In 1912 a flood stage in the Mississippi River overflowed a portion of the city and polluted water gained entrance to a tunnel through a manhole, the cover of which had previously been broken by accident. In 1919 a broken sewer main located near a tunnel resulted in a gross pollution of this supply.

In order to determine the actual condition of this collection system, the present superintendent of the water department personally inspected the drifts and tunnels while the pumps kept them comparatively free of water. It was found that many of the drift boxes had become partly rotted so that the joints in the plank and at the unions with the well casings and tunnels were leaking. Water

was also forcing its way into the tunnels at numerous points. It has been estimated that the total yield from the tunnels exceeded the combined capacities of the wells.

The source of this leakage into the drifts and tunnels, independent of the water coming directly from the wells, can only be conjectured. If the pressure in the artesian sands is always sufficient to maintain a water level above the top of the tunnel system, this might support the assumption that the leakage is artesian water from lower levels. It seems, however, to be equally possible for surface water to find its way to the tunnel level. Under ordinary conditions surface water reaching this depth has been subjected to certain purification by passage through the sand and clay strata overlying the tunnel and may or may not be of a safe sanitary quality. On the other hand, it may be possible for surface water to penetrate more directly by means of abandoned or faultily constructed well casings or other means of more direct communication or the balance between the water from the deep artesian sands and the upper surface or ground water may be established at a level near or below the tunnel, so that any leakage into the tunnel system may well be regarded with suspicion.

2. Central Avenue plant.—There are five deep wells in this development, two being 14 inches, the others 10 inches, taking water from the same artesian sands by air lift, discharging into a concrete collecting well of a capacity of 100,000 gallons. The mechanical equipment seems adequate. The average daily pumpage is given as 5,000,000 gallons. The output from this plant is pumped directly to the mains.

3. Segregated wells.—Located in streets and alleys over an irregular line of about 10 miles there are 15 deep wells of similar construction to those previously described. Each well is equipped with a 100-horsepower motor-driven deep-well pump of a rotary type, of a capacity of 1,000,000 gallons per day, delivering water directly to the mains. The motors and pumps are placed in concrete underground chambers, reached through a manhole. They are thrown into service as needed and, while they would normally supply the demands of the district immediately around each pump, the surplus is distributed to the general system.

Distribution and cost of operation.—The total pumpage for 1919 was 5,478,246,000 gallons, representing an average daily consumption of slightly over 15,000,000 gallons, an increase of 1,333,500 gallons over the daily average for 1918.

There are approximately 27,000 services, about 75 per cent of which are metered. It is estimated that at least 95 per cent of the total population of the city use this public supply.

The total operating cost for 1919 was $309,387.34; the fixed charges, including interest and sinking fund, $189,777.36. The gross income

was $512,040.51, leaving a balance of $12,875.81, which was applied to a previous overdraft. There are at present outstanding bond issues to the amount of $3,200,000.

Laboratory control.—The water department maintains no laboratory for the examination of this supply. Bacteriological examinations are made at the health department laboratory. Prior to 1919 these examinations were made only occasionally, usually upon some complaint. Following the typhoid epidemic of 1919, the total bacterial content of two samples has been determined on six days of each week. Tests for *B. coli* in sugar media are not made. The total count on agar at 37° C. after 24 hours' incubation varies from 0 to 4 or 5 per cubic centimeter.

In the face of recent history of typhoid fever epidemics and because of the fact that no treatment or other safeguard is applied to this supply, especially that from the tunnel system, daily examinations are surely indicated. Early knowledge of pollutions such as have already occurred would permit of effective treatment and reduce the dangers of a repetition of previous disasters. A sufficient number of samples should be collected daily from the several systems and examined for total bacterial count and the presence or absence of *B. coli*, in order to maintain a constant vigilance over the sanitary quality of the water from the various sources and to detect any introduction of dangerous pollution.

Quality of supply.—Reference has already been made to the several instances of gross pollution of this supply and to the average daily index of purity as determined by laboratory examination.

Consumers receiving water from the tunnel system offer frequent complaints concerning the physical properties of the supply. In summer this water becomes warm and unpleasant to taste. The entire artesian supply is said to contain iron in the proportion of about two parts per million gallons. Exposure to air liberates carbon dioxide and precipitates the iron in an insoluble form, resulting in serious damage to plumbing fixtures and making it unsuitable for laundry purposes.

Treatment.—There is no treatment of any form applied. There are also no storage facilities. In the plans being formulated for extension of the present system, a storage reservoir is contemplated of a capacity equal to about the average daily consumption. This will serve to better satisfy the fire underwriters and permit of the elimination of the excessive iron content.

In the event of a repetition of such polution as has already taken place and resulted in probably 3,000 cases of typhoid fever, even if it should be detected early, it would not be possible to entirely prevent an explosive outbreak of intestinal infections for the reason that no facilities are at hand for the disinfection of the polluted supply.

During the 1919 epidemic, the part of the tunnel system directly receiving the pollution was shut off as effectually as possible but not until some time after gross pollution had taken place.

Because of these conditions and because of the known leakage into the tunnel systems from unknown sources, the purchase and installation of chlorine disinfection apparatus and continuous disinfection of the tunnel supply was strongly recommended at the time of the present survey. With daily bacteriological examinations, both for total bacterial count and for the detection of the presence of *B. coli*, of samples taken preferably at the pump wells, thorough disinfection of the other supplies could be started within about 48 hours after dangerous pollution was first discovered. Disinfection should be undertaken also immediately upon the appearance of any definite indication of pollution as shown by bacterial analyses. Failure to make provision for adequate sterilization must be considered virtually criminal negligence, and the cost of installation would have avoided the lawsuits now pending against the city for monetary recompense for the lives lost and jeopardized during the last typhoid epidemic.

Future supply.—Increasing consumption has already brought about a recognition of the necessity for extending the present supply. The total operating cost in 1919 was $56.50 per million gallons or $91.30 including fixed charges. The cost of operation of the present system is high, and while no detailed study of comparative costs of a change to some other source of supply was made, the desirability of installing a modern filtration plant for the treatment of water taken from the Mississippi River should be seriously considered before expending further funds in the extension of the present source. It is believed that a water of better sanitary and chemical quality would be secured at a lower cost, provided the items of fixed charges can be advantageously adjusted.

Memphis, like many other communities, has boasted of the purity of its public water supply. It is indeed time now to recognize the rôle it has played in contributing to preventable morbidity and mortality and to make suitable provisions for properly safeguarding the present supply or obtaining a new supply that is not open to suspicion. A really safe water supply is a valuable asset, and the cost of such an asset should be a minor consideration.

PRIVATE WATER SUPPLIES.

No record could be secured of the number of private water supplies in use. Some of the larger hotels and industrial plants have well supplies, which tap the deep artesian sands, and it is estimated that possibly 3 per cent of the population are using water from private wells.

As far as could be determined, there has been no special attention given to these deep-well supplies.

Private wells.—Scattered about the city, mainly in the outlying sections, there are several hundred private wells, located near sidewalks or in back yards. These wells are said to have a depth of from 50 to 75 feet, terminating in clay and lined with either iron or vitrified pipe. One length of tile projects above the ground and water is drawn up by windlass and receptacle of a sand-bucket type. The projecting tile usually has no protection whatever against willful or accidental contamination of the well.

These wells are usually located in sections that are as yet unsewered, and consequently are frequently in rather close proximity to insanitary, soil-polluting privies. In the past some of these wells have been condemned and abandoned wherever the public water supply was available.

There is no attempt at routine laboratory examination of samples of water from these private wells. They are obviously of faulty construction, lacking in adequate protection at the surface, and in the absence of bacteriological examinations many of them would be condemned from the findings of a sanitary survey alone.

In view of the above a thorough survey of all private wells is indicated, and a careful laboratory study should be made of the sanitary quality of each supply and all definitely polluted or suspicious wells should be immediately condemned and abandoned.

The relation of contaminated water supplies to the incidence of typhoid fever and various intestinal diarrheas is well established and because of the excessive mortality in Memphis, particularly from typhoid fever, these private well supplies should be at once eliminated as a contributing factor to this class of preventable diseases.

Bottled water.—The recent epidemic of typhoid fever served to promote an increased demand for bottled water and quantities of "spring" water have been sold in the city. Many families had already been using these spring waters because of the high iron content of the city supply. This practice introduces another problem, that of the sanitary quality of the spring water supplies and it becomes incumbent upon the health department to investigate these supplies and determine their purity. There have apparently been undertaken no measures for the control of these bottled waters.

DISPOSAL OF SEWAGE.

A system of sewers was installed in Memphis in 1880, and in 1898 about 70 miles of mains had been constructed. At the present time sewers have been made available to probably 99 per cent of the total population of the city and it is estimated that about 95 per cent are

connected. Permits for connections are required, but the records are incomplete.

Sewage, both domestic and storm water, is discharged without treatment, directly into the Wolff and Mississippi Rivers.

Extensions to the original system have been continued until, in some sections, the mains have reached the surface. To reach these sections, it will be necessary to construct new collecting mains and it was understood that plans are now under way.

Outside yard closets.—In practically all the sections occupied by the colored and to some extent by the poorer white population, so-called "yard closets" are in use. These closets are of the hopper type and are flushed by a hand-operated valve on the water pipe line which supplies water directly to the hopper. They are connected to sewer laterals, the traps being vented with a 4-inch iron stack which is extended above the roof of the housing. The small wooden structures that house these closets are for the most part poorly constructed and usually dilapidated and neglected.

In company with the mayor, the commissioner of sewers, his assistant and the chief sanitary inspector, several hundred of these yard closets were inspected for the purpose of indicating from personal observation the decided health menace arising from the construction and operation of this kind of closet for the disposal of human excrement. The evidence secured from this trip of inspection was most convincing.

The hoppers are of a type practically impossible to be thoroughly cleansed with the flush provided and flushing depends entirely upon the whim of the user. The water was found shut off in several and a number were filthy beyond description. None of the superstructures made any pretense at being fly proof. To a varying extent, there is practically always an exposure of fecal matter that has dried on or been left adherent to the hopper.

These yard closets are to be found in nearly every ward in the city. They are in use in close proximity to the Bruce High School, in the shadows of the Baptist Memorial Hospital, and are scattered about the business district and in nearly every residential section. The total number now in use could not be ascertained, but it is estimated that probably at least 40 per cent of the total population use this method of disposal.

In the absence of epidemiological proof to the contrary, it is believed that these yard closets must be considered a factor in the high summer prevalence of typhoid fever in Memphis. Their distribution, construction, and the insanitary condition in which they are generally maintained must be considered as increasing the number of at least potentially dangerous foci from which the infectious agents of intestinal diseases may be spread. The difference between

these yard closets and the insanitary open privy as health hazards is the relative degree of exposure of fecal matter that takes place.

The correction of these sanitary hazards should receive the immediate attention of the municipal authorities. The problem is a difficult one from certain aspects. The majority of the occupants of the premises where yard closets are provided are colored tenants and the installation of inside closets is usually impossible.

Until there can be effected some substitution of a more sanitary type of hopper in these yard closets, systematic inspection should be undertaken in order to reduce as much as possible the menace arising from careless operation of these closets. Although difficult of enforcement, the insistence of reasonably effective fly proofing of at least the hopper will result in some reduction in transference of infectious discharges by flies. Under proper supervision no extensive personnel force will be necessary for such an inspection service.

Privies.—The city ordinances provide for so-called "earth closets" where public sewers are not available. A water-tight box or bucket is required and dry earth or ashes must be used "at least once a day" to cover all deposits, the night soil to be collected by the city "once every two weeks or oftener if necessary." All privies are placed under the supervision of the health department.

There are about 1,300 of these earth closets in use in unsewered sections. No record could be secured of their actual number or location. A personal inspection of a considerable number revealed conditions that should constitute a disgrace to any self-respecting community. In apparent compliance with the ordinances, some sort of a receptacle is usually provided, in many instances a galvanized tub or wooden pail. In one alley about 30 privies were found, the receptacles overflowing or leaking onto the ground, the space under the seat open in the back with no covering whatever. This was in a colored section of over a hundred houses. The owner of this property lived nearby and also maintained an insanitary privy.

The alley cleaning department was recently transferred to the street department. Night soil is collected in tank wagons and discharged into the sewer at two disposal stations.

The inspection of these privies has been carried on under the division of sanitary inspection. Personal observation indicated that there has been but little supervision maintained over the sanitary condition of this decidedly dangerous method of disposal of human excrement. There was no evidence of any supervision. A maximum exposure of contents with excessive soil pollution prevailed generally. In the sections using the private wells previously described, this uncontrolled pollution of the soil obviously exposes these wells to dangerous contamination.

Until public sewers can be made available and the insanitary privy abandoned, there is only one remedy for this method of excrement disposal and that is the installation of sanitary privies, maintained under adequate and constant supervision. A water-tight receptacle, protected from flies, with frequent collections by the city scavengers, should be the minimum requirements.

In considering the problem of the maintenance of the necessary supervision over these privies, it would seem desirable to assign the inspection service to the department responsible for the collection of night soil, namely, the department of streets, bridges, and sewers, and this suggestion was favorably received by the commissioner of this department. Under the present administration it is believed that this plan of developing the necessary inspection service in connection with the scavenging department will be feasible and adequate and avoid any divided responsibility in the supervision of this problem.

COLLECTION AND DISPOSAL OF REFUSE.

Garbage.—The collection and disposal of domestic garbage and other forms of refuse, including ashes and trash, was transferred from the health department to the department of streets, bridges, and sewers early in 1920. The collection service and equipment owned by the city is being reorganized and extended at the present time. Heretofore collection has been inadequate and many complaints have been made to the health office.

It was estimated that the daily production of domestic wastes, such as garbage, ashes and other refuse, averaged about 750 cubic yards. The present equipment can handle a maximum of about 450 cubic yards, but only about 360 cubic yards are collected daily. New wagons and motor trailers are to be added in order to increase the collections.

All of the garbage and some of the trash is disposed of by burning it in three incinerators owned by the city and located in the three collection districts. From one to three tons of coal are required daily to complete the combustion of these wastes. The total capacity of the three incinerators is given as 195 tons per diem and they are being operated without apparent nuisance.

Ashes and some other refuse is disposed of mainly by utilizing it for filling at various dumps.

According to the estimates by the city commissioner in charge of refuse collection, the city has been collecting only about 50 per cent of all refuse produced. There has been but little control over the disposal of the balance. This has been left largely to the producer. A considerable quantity of refuse, especially ashes and trash, has

been thrown into the bayous or otherwise disposed of with the least possible inconvenience.

The popular conception concerning the relation of garbage and other refuse to the public health is based upon inherited misconceptions of the origin of disease and its usual mode of transmission. Filth and disease are still closely associated in the minds of many individuals and for this reason health departments have been charged with the collection and disposal of all forms of municipal wastes. The discovery of the true causes of many diseases and their mode of spread have transferred the attentions of the sanitarian from "filth" as such and conditions of environment to the infected individual as the vital factor in the spread of most diseases. Filth of any sort is still just as repugnant to our senses of sight and smell, but its relation to disease is rather an indirect one and refuse collection becomes more a problem of municipal housekeeping and civic pride in our environment and appearances of general cleanliness.

It is true that garbage will, under certain conditions of neglect, breed flies or attract flies and rodents, and it is known that flies may act as mechanical conveyors of infection; hence the bearing of garbage upon disease transmission. If, however, fly breeding in stable manure is reduced to a minimum, and garbage is properly stored in covered receptacles and collected at regular intervals, the health department has no special interest in garbage as a health hazard, and the supervision over the garbage can and the storage, collection, and disposal of garbage, as well as other classes of household refuse, may properly be assigned to the scavenging department.

Under present arrangements the collection and disposal of all refuse is a function of the department of streets, bridges, and sewers. In order to maintain adequate supervision over the personnel engaged in the collection service, it will be necessary to employ supervisors or inspectors. But little expansion of this force of inspectors would be required in order to enforce the city ordinances or regulations governing the storage of garbage and other refuse on premises before its collection. The employment of supervisors or inspectors to maintain a satisfactory collection service and sanitary inspectors to enforce regulations governing the type of garbage can to be used and the method of storing garbage brings about a duplication of personnel, a division of supervision over a municipal function that will result in lost motion, added expense, and disclaimers of responsibility.

The development of an adequate inspection service in connection with the present refuse collection department was discussed with the commissioner of this department and the adoption of such a plan was considered the most practicable and economical means of maintaining the required supervision over all phases of refuse storage,

collection, and disposal, and it is, therefore, recommended. This places the responsibility where it properly belongs and relieves the health department of a function that has but little, if any, bearing upon public health.

The development of this inspection service will not be discussed here. With harmonious interdepartmental relations it should be possible to organize and carry on such a service and bring about really effective control over a difficult municipal problem.

Stable manure.—Flies breed by preference in horse manure. It requires about 10 days during the summer for the development of the egg into the mature fly. Consequently, in order to prevent or interrupt the breeding of flies in this refuse material in a city block it is necessary to either securely protect it from the access of flies or remove it at intervals of from five to seven days during the breeding season. Attempts to prevent fly breeding by storing stable manure in fly-proof pits or by chemical treatment of the manure are often failures or only incompletely successful. Complete and frequent removal answers all the requirements and is usually the method of choice.

Flies are undoubtedly capable of transferring infectious material and have been convicted as agents in spreading typhoid fever and other intestinal disorders, and they may convey infection in such diseases as tuberculosis, smallpox, scarlet fever, and other similar affections.

As far as could be determined there has been no effective supervision maintained over fly breeding in Memphis by requiring proper disposal of stable manure. Action has been apparently taken usually only upon complaint.

In Memphis the department of streets, bridges, and sewers has been given the function of city scavenger and is now charged with the collection and disposal of garbage, refuse, and night soil. Although it may not be feasible for the city to collect stable manure, it is believed that supervision over its storage and frequent removal may logically be placed in this same department and maintained through a newly created inspection division previously referred to in the discussion of garbage and refuse disposal. Under competent supervision, fly breeding in stable manure can be satisfactorily controlled and this class of waste eliminated.

SUMMARY OF PRESENT HEALTH ACTIVITIES AND SANITARY CONDITIONS IN MEMPHIS.

The city of Memphis, with a present population of slightly over 160,000, expended approximately $86,700 during the calendar year 1919 for the operation of its health department, or about 55 cents per capita. This sum does not include any items pertaining to the

collection and disposal of garbage, refuse, or night soil, the operation of the city hospital, or the allotment of about $10,000 made to the associated charities and Public Health Nursing Association. In other words, the $86,700 represents the expenditure made for those municipal activities regarded as purely public health functions.

An expenditure of 55 cents per capita is a reasonably adequate investment in public health work for the average city of the size of Memphis. Although it is perhaps difficult to audit the activities and results of public health work in terms of sickness prevented, lives saved, or other expressions denoting effective application of measures undertaken for the promotion of health and sanitation, there should nevertheless be some indication of the effect of such an expenditure upon the vital statistics or the composite sanitary picture of the city in order to justify further appropriations.

A study of the mortality statistics of Memphis for the past 20 years reveals no reduction in the general gross death rate; in fact there has been a decided increase in the death returns for certain important preventable diseases, notably typhoid fever and tuberculosis, and this increase has apparently been due to an increasing incidence of these infections in the colored population. Of the total deaths from disease occurring each year, about 40 per cent have been due to causes ordinarily accepted as preventable.

A rather thorough survey of the general sanitary conditions existing at the present time would seem to indicate either that there has been an absence of effective supervision or that local conditions are especially difficult to control.

In view of what has already been set forth in the body of this report there would appear to be sufficient basis for the conclusion that the conditions responsible for high morbidity and mortality rates and the general sanitary status of the city are very largely the result of an unorganized health administration, conducted under part-time untrained chief executives who have been supported by a personnel for the most part unqualified for their positions. The influences of pernicious politics must be credited with most of the responsibility for such a condition of affairs.

The composite health of a city, as reflected in its morbidity and mortality records, is of vital concern to the city itself and a component factor in determining the general healthiness of the State of which it is a part, as well as that of the country as a whole. The status of health and sanitary conditions obtaining in any city underlies its industrial and business activities, and that city will not long continue to be progressive or prosperous which countenances excessive death rates from preventable causes or remains satisfied with a low sanitary rating.

Health administration in Memphis has been continued mainly along lines of least resistance and shows but little indication of progress or development. Positions created by laws establishing the original "board of health" have been carried along in spite of the fact that the board was abolished in 1909. The duties of the present superintendent of health have not been clearly defined, and his salary has been fixed by law on a basis of $3,000 per annum. Organization of personnel is weak, there being no well-defined bureaus or divisions for prosecuting any definite administrative policy under full-time trained chiefs of division.

These statements are not put down in the nature of destructive criticism, but rather intended as an explanation of many of the conditions emphasized by the present survey.

There has been but little attempt to carry on any campaign of publicity that would secure the intelligent cooperation of the general public and make possible higher standards of healthfulness and sanitation. It is true that many of the lessons of personal hygiene must be self-taught, but there remains a wide field of activity for the health authorities, and the average individual must be taught his responsibility in avoiding infection and preventing its spread to others.

The existing laws pertaining to health and sanitation are scattered and in some instances out of date. A careful revision should be undertaken and the resulting laws, ordinances, and regulations should be codified and made readily available.

The publication of the monthly annual reports has served no special purpose. These reports are mainly statistical, and as such are of but little, if any, real value, and serious errors appear in many of the tables.

The registration of vital statistics has not been satisfactory, the records of births and deaths are poorly kept, and they have served no useful purpose as far as the health department is concerned. The registrar of vital statistics has no official status in the health department, although his deputy is now a clerk in the department and the records are readily available. It would seem most desirable to secure the necessary amendments to State and local laws to permit the appointment of a regular officer of the health department to the position of registrar of vital statistics. This change would undoubtedly bring about considerable improvement in the registration of births and deaths.

In the present organization, such activities as have been undertaken show but little interrelation. One of the most important functions, that of the control of communicable diseases, has not been properly developed. Morbidity reporting is only fairly satisfactory

or complete. There has been practically no epidemiologic study made of those diseases responsible for excessive morbidity, and mortality rates and office records are quite incomplete and meager.

Such control measures as have been undertaken as routine are uncertain as to their scope and effectiveness. Tuberculosis, a large factor in the annual mortality, is practically uncontrolled. The problem of infant mortality, including prenatal instruction and supervision over the health of preschool ages, remains virtually untouched. Adequate and effective control is lacking over such diseases as typhoid fever, malaria, diphtheria, and the usual infectious diseases of childhood.

Public health nursing, now recognized as one of the most powerful weapons of a modern health department, has been subordinated to a nursing service developed in connection with a medical inspection of schools.

Facilities for the hospitalization of communicable diseases are entirely inadequate. The small, poorly equipped 15-bed hospital now used for this purpose should be abandoned and provisions made for a modern communicable-disease hospital of at least 100 beds.

Memphis acquired the distinction of heading the list of large cities in 1919 with a typhoid death rate of 58.4 per 100,000. This high death rate was due to an epidemic brought about by a sudden gross pollution of the city water supply with human fecal matter, the direct result of a broken sewer main. A similar extensive water-borne epidemic of this disease occurred in 1912, due to flood conditions and sudden contamination by raw sewage. Deaths from typhoid fever reached a still higher point in 1911, and while epidemiologic evidence is lacking, there seems to be reason to believe that the excessive mortality for this year, largely the result of a serious epidemic, may very probably have been due to an unrecognized contamination of the public water supply.

This history of repeated water-borne epidemics of typhoid fever, and the brief description of the present water supply system submitted in this report, is considered sufficient evidence to indicate the urgent necessity for prompt action for the immediate correction of the conditions responsible for previous extensive epidemics. There appears to be sufficient evidence to support the condemnation of the old tunnel collection system of deep well supplies and to warrant the recommendation of continuous disinfection of this supply or its abandonment.

Numerous other factors undoubtedly responsible for the continued high endemic incidence of typhoid fever have been noted, namely, grossly insanitary privies; insanitary "yard closets" widely distributed over the city; abundant fly breeding and inadequate supervision over the collection and disposal of garbage and other organic

"filth"; a doubtful sanitary quality of milk supplies due to inadequate supervision and control; noneffective control measures over public eating places and food supplies in general; and the influence of poor housing conditions affecting a relatively large proportion of the population. These factors, with the lack of effectual control over actual cases and carriers, explain the continued high mortality from this disease.

With the exception of the operation of several milk stations during a few months in the summer, the health department has undertaken practically no activities related to infant welfare, including accurate registration of all births, prenatal instruction, the control of midwifery, or the promotion of the health of preschool ages and children in industry. Allied organizations such as the associated charities and Public Health Nursing Association have attempted some prenatal and infant welfare service, but there has been no correlation between the activities of these private organizations and the health department.

The appalling mortality from tuberculosis has been emphasized. The gross death rate from all forms of this infection has been steadily increasing, due to a truly alarming increase in the fatality among the negroes, as shown by the table and chart presented. This disease has been very incompletely reported, and its control has been emphatically neglected. The erection of the Oakville Sanatorium should serve as a nucleus for a strenuous campaign of publicity and determined effort at control.

A review of published annual reports of the health department might indicate that the medical inspection of school children had been receiving considerable attention. On final analysis, however, it would be difficult to point out any definite results obtained from past expenditures of considerable sums of money for a large medical personnel engaged for part-time service as medical inspectors. At present there is virtually no medical supervision over school children. Sixteen health department nurses spend most of their time in the schools on routine work, and while something has undoubtedly been accomplished by this force, there is lacking any fixed policy or plan of medical supervision. The importance of such supervision has been clearly established, and in undertaking a reorganization of the health department a division for the health supervision of school children should be included and developed in connection with a department of school hygiene established under the board of education.

The venereal-disease problem has already received attention and plans for continuing this important work as part of a State-wide program have been proposed by the United States Public Health officer in charge of the State division of venereal diseases, a part of

the State board of health organization. Clinic facilities and a detention home for white women have been provided. An allotment of $5,889 by the city to match an equal amount of Federal funds to carry on control measures during the coming fiscal year ending June 30, 1921, has been authorized. A division of venereal diseases should be established as a subdivision of the bureau of communicable diseases in the reorganized health department and all local activities placed under the supervision of this division.

Malarial infection has very frequently been returned as the cause of death and, it is believed, often without the support of laboratory diagnosis. The exact incidence of true infection by the plasmodium of malaria has not been determined, and deaths reported under this classification cover a multitude of shortcomings as to diagnosis. Better reporting and control of actual cases confirmed by laboratory examination of blood smears is clearly indicated. Mosquito eradication measures undertaken first in 1917 under United States Public Health Service direction should be considered and a tentative plan and budget for the coming season has been presented.

The city chemist, as chief of the health department laboratory, in addition to such diagnostic work as is being carried on, is charged with the enforcement of the pure-food ordinance, supervision over meat and milk inspection, and control of food inspection, and the preparation of narcotic solutions distributed by the antinarcotic dispensary. Samples of the city water supply are examined daily. While considerable credit should be given to the present incumbent of this office, the establishment of separate divisions for the control over milk and the handling of foodstuffs will relieve the laboratory director of these responsibilities and permit the development of a public health laboratory per se. When the proposed new quarters are available, ample provisions should be made for supplementing the present equipment, and every effort made to enlarge and expand the activities of the laboratory by extending its usefulness for diagnostic purposes and encouraging practicing physicians to take every advantage of the facilities offered.

The control of foodstuffs, including supervision over public eating places and the preparation and handling of food, should be more rigidly enforced. The importance of the health of employees, the effective sterilization of eating utensils, and proper methods of handling and displaying articles of food, has apparently not been sufficiently stressed.

A force of two inspectors for maintaining the necessary supervision and control over all sources of milk supplies is obviously inadequate. Progress has probably been made in securing somewhat better equipment and methods at many of the near-by producing

dairies, and the tuberculin testing of dairy cattle has been very well enforced. The grading of milk is desirable, but steps should be taken to secure milk of grade A quality, none of the present supply meeting the requirements of this grade. The sale of milk now offered under a "certified" label should be discontinued until this supply can be properly certified. Laboratory examinations and a knowledge of present methods of production and handling appear to substantiate the statement that the sanitary quality of a considerable portion of the total milk distributed in the city must be accepted as doubtful.

The importance apparently attached to the abatement of general nuisances has been emphasized by the establishment of a division of sanitary inspection and the employment of about 15 inspectors, an item of approximately $20,000 annually. The results that have been accomplished by this inspection service do not seem to warrant such an expenditure of public funds. In the organization suggested, control over general sanitary problems is vested in a division of housing and sanitation.

To avoid any division of authority or shifting of responsibility, the inspection and supervision over the storage, collection and disposal of all municipal wastes, including garbage and night soil, should be a function of the department charged with its collection and disposal, namely the department of streets, bridges, and sewers. The supervision and control necessary to prevent the creation of nuisances arising from improper methods of storage and disposal of these wastes can, and it is believed that they will, be satisfactorily exercised by this other department, and the health department will be relieved of a function of no direct public health importance.

It is believed that sufficient evidence has been presented to warrant a complete reorganization of the Memphis health department. In presenting the following plan of organization, the personnel and budget suggested is based upon present urgent needs and existing conditions requiring prompt action. Under a full-time trained executive director of health, the growth and expansion of health activities will follow naturally, provided the moral and financial support of the municipal authorities and the general public is secured and maintained.

RECOMMENDATIONS FOR REORGANIZED HEALTH ACTIVITIES.

In submitting recommendations for a reorganization of the present health department in Memphis, there is presented, first, a suggestive plan of organization and budget, indicating a nucleus or the minimum personnel and funds that will be required, and, second, a brief discussion of certain phases of the proposed organization.

Proposed Organization and Budget (One Year).

Department of Public Affairs and Health.

COMMISSIONER OF HEALTH.

(Mayor)

Department of Health.

DIRECTOR OF PUBLIC HEALTH.

Salaries and expenses.

I. BUREAU OF ADMINISTRATION.

Director of public health	$5,000
1 secretary and chief clerk (also deputy registrar of vital statistics)	1,500
1 messenger	900
Miscellaneous supplies and expenses	1,000

II. BUREAU OF MEDICAL INSPECTION.

Director of public health in charge.	
1 clerk and stenographer	1,500
Division of communicable diseases:	
1 clerk and stenographer	1,500
1 medical inspector	2,500
1 supervisor of nurses	1,800
7 public health nurses (white), at $125 per month	10,500
3 public health nurses (colored), at $75 per month	2,700
1 quarantine officer	1,500
Transportation, supplies, and expenses	2,600
Venereal-disease control:	
Personnel and expenses charged to a special allotment of $5,889.	
Division of child hygiene:	
Chief of division	3,500
5 medical inspectors (part time), at $50 per month	3,000
4 public health nurses (white), at $125 per month	6,000
1 public health nurse (colored), at $75 per month	900
Transportation, supplies, and expenses	2,250

III. BUREAU OF LABORATORIES.

Director	3,000
1 technician	1,500
1 laboratory assistant	900
Miscellaneous supplies and expenses	1,500

IV. BUREAU OF MILK AND FOOD INSPECTION.

Director (sanitary engineer).[1]	
1 assistant director (veterinarian)	2,400
2 dairy inspectors, at $125 per month	3,600
1 meat inspector (veterinarian)	1,800
3 food inspectors, at $125 per month	4,500
Transportation, supplies, and expenses	2,500

[1] One sanitary engineer in charge of bureaus IV and V.

V. BUREAU OF SANITARY ENGINEERING.

Director (sanitary engineer)	$3,500
1 clerk	1,250
Transportation, supplies, and expenses	1,200
Division of housing and sanitation:	
Chief of division (chief of sanitary police)	2,500
Seven sanitary police at $125 per month	10,500
Miscellaneous supplies and expenses	500
Division of mosquito eradication:	
In charge of sanitary engineer.	
During the breeding season, additional personnel and supplies as outlined in appendix, charged to separate allotment. Estimated cost, 1920, $10,000.	
Total one year	90,300

NOTE.—All personnel are to be full-time unless otherwise noted.

APPOINTMENTS, DUTIES, AND FUNCTIONS.

As provided under existing laws, the mayor, as commissioner of public affairs and health, is held directly responsible for the conduct of the health department.

In attempting the reorganization of the present health activities of the municipal government as herein suggested, amendments to certain laws and ordinances now in force will be necessary. Provisions by law must be made for the appointment of the director of public health and his subordinate assistants and the powers and duties of the director should be clearly defined. Laws and ordinances now in force pertaining to the health and sanitary regulation of the city should be carefully studied and revised to meet present conditions and requirements and finally codified.

PUBLIC HEALTH COUNCIL.

An advisory public health council, developed along lines followed in establishing similar councils in connection with some State and municipal health departments, would seem to be most desirable, particularly because of the urgent need of enlisting the support and full cooperation of the general public and all agencies engaged in health activities or whose services might properly be so extended.

Membership in the council should be selected with care and only with a view of further promoting the public health. It is suggested that five members be appointed by the mayor for terms of five years, one term to expire each year in rotation. In making these appointments, due consideration should be given to secure a fair and equitable representation of various civic activities, including (1) the local medical profession; (2) the chamber of commerce and business

interests; (3) the federated women's clubs; (4) the charitable, private nursing, and allied organizations; and (5) the legal profession. In order to escape future political influences it would be most desirable, if possible legally, to have nominations for membership made to the mayor by the representative bodies.

A public health council of this character might be compared to various commissions now appointed, such as the park commission or the city planning commission.

For the present, the council should perhaps have no executive, administrative, or appointive authority. In developing such a council, consideration should be given to the desirability of extending its usefulness by delegating to it certain powers and duties such as proper authority to visé the expenditures of the health department, to pass upon annual budgets, to approve and assist the director of health in formulating rules and regulations for the preservation and promotion of the public health for presentation to the city commissioners for final adoption.

Council members should serve without salary or other compensation except reimbursement of actual expenses duly authorized.

Meetings at stated intervals should be held with the mayor and director of health as ex officio members, and all business relating to the public health should be considered. The selection of a chairman and the adoption of by-laws are details of organization.

A properly constituted public-health council will be of invaluable service and assistance to the municipal authorities, and particularly to the director of health in deciding upon general policies to be adopted. It would act as a medium through which the general public could be reached and its attention and cooperation secured. On the other hand, the support and approval of the council would strengthen the position of the director of health in dealings with the municipal authorities.

DIRECTOR OF PUBLIC HEALTH.

Successful administration of the health department will depend largely upon the choice made in selecting its chief executive officer or director of public health. He should be chosen after careful consideration of his qualifications for this important position and his adaptability to local conditions. He should be required to devote his full time to his official duties, his tenure of office should depend only upon his efficiency and conduct, and he should be paid a salary commensurate with the importance of his position.

The positions of superintendent of health, health officer, and secretary as now established should be abolished and the necessary amendments to existing laws and city ordinances should be carefully

drawn and passed to permit a complete reorganization of the department.

ORGANIZATION AND PERSONNEL.

The director of health should be given full authority to reorganize the health department and to appoint and remove all subordinate personnel.

The plan of organization recommended above will require time for its development and changes will no doubt be indicated as progress is made and conditions change or new problems present themselves. The outline presented is fairly self-explanatory and only a brief discussion of certain items will be undertaken.

BUREAU OF ADMINISTRATION.

In addition to the management of all business of the department and general supervision over the several bureaus and divisions, there will be needed an active educational publicity campaign, and attention should be given to improvement in the registration of vital statistics.

DIVISION OF COMMUNICABLE DISEASES.

As a division of the bureau of medical inspection, the control of communicable diseases represents one of the most important functions of the department. The chief of this division should be a full-time, trained executive, properly qualified for the position. As assistant director of health, he should assume entire charge of the department in the absence of the director.

In the face of excessive death rates from such diseases as typhoid fever and tuberculosis, the program for this division is a strenuous one. An intensive and extensive epidemiologic study of those infections showing high morbidity rates should be undertaken and the necessary control measures instituted and diligently prosecuted.

Sixteen public-health nurses are included in the organization proposed. Eleven have been tentatively assigned to public-health nursing in connection with the control of communicable diseases and five to child hygiene activities. A redivision of these nurses may subsequently be indicated. The importance of an adequate public-health nursing service needs no special discussion. Under proper supervision, these nurses will render invaluable services in instituting effective bedside prophylaxis, promoting personal hygiene and securing the active cooperation of the individual, and in addition assist the chief of the division and the medical inspector in the epidemiologic study of cases reported and in carrying out necessary control measures.

DIVISION OF CHILD HYGIENE.

This division includes school medical inspection and all infant and child welfare activities. As progress is made in developing these lines of activities, additional personnel will be required. For the present it is believed the organization suggested will permit the inauguration of a definite program for the health supervision of school children, the prevention of unnecessary infant mortality, and the promotion of child welfare work in general.

Past experience points to the desirability of providing one medical inspector and one school nurse for every 2,000 to 3,000 children enrolled in the schools. On this basis from 8 to 12 school physicians and an equal number of school nurses would be required.

The duties to be undertaken under the head of school medical inspection have been briefly outlined in the body of this report.

In outlining a plan for better conservation of child life, provision should be made for the necessary supervision and attention to prenatal conditions responsible for unnecessary maternal sickness and death in childbirth and unfavorable or fatal issues to the unborn; improved obstetrical and nursing care; accurate and complete registration of births; proper care of the newborn; supervision over the health of children in preschool ages and in industry; adequate facilities for baby clinics, milk depots, etc.

BUREAU OF LABORATORIES.

The establishment of a separate bureau of milk and food inspection will relieve the director of the laboratory of the responsibility of this function and permit the expansion of the laboratory along other lines. Additional equipment is needed in order to extend the scope of examinations made and physicians should be encouraged to make full use of facilities offered for diagnostic purposes. Provisions should be made for more extensive bacteriological examinations of the milk supply as a check on its sanitary quality. The importance of maintaining constant check on the purity of the city water supply has been previously emphasized.

A proposal has been made to the city by the authorities of the university medical school to establish a joint laboratory to meet all the needs of the health department and the university. Such an arrangement may prove of mutual advantage, but it is desired to emphasize the fact that any division of authority over the control of the operation of the laboratory would decrease its usefulness and value to the health department. A joint laboratory would prove an economic investment for the university and the trained personnel could be utilized for teaching purposes, but the director and his

assistants engaged in health department work should be placed entirely under the direction and control of the director of health.

BUREAU OF MILK AND FOOD INSPECTION.

Although organized as a separate bureau, it is placed under the direction of the sanitary engineer for the present. The personnel indicated should be ample for very effective control over milk and foodstuffs. Dairy inspection should be extended and better control established over the methods of production and handling of milk and milk products. Pasteurization of all supplies under adequate supervision should be encouraged and extended as rapidly as possible. A more rigid enforcement of the requirements for grading milk should be brought about and the sanitary quality of the milk when distributed to the consumer should be constantly controlled by bacteriological examinations.

Better control should be established over the preparation and handling of other foodstuffs, particular attention being paid to public eating places.

BUREAU OF SANITARY ENGINEERING.

The services of a competent, well-trained and experienced sanitary engineer are especially needed. In addition to duties in connection with the supervision over milk and food inspection, there is urgent necessity for a careful and thorough survey of all conditions affecting the sanitary status of the city, including private water supplies and the problem of the disposal of all refuse and wastes, particularly garbage, night soil, and manure. The transfer of the responsibility of maintaining effective supervision over the storage and disposal of all wastes to the department of streets, bridges, and sewers has already been recommended.

A division of housing and sanitation should be organized and given supervision over the housing problem as it affects health and all matters relating to general sanitation and public hygiene. A complete and thorough house-to-house survey will reveal the extent and character of the conditions requiring correction and supervision.

The cooperation of the police department should be obtained to assist by the investigation and abatement of nuisances that are ordinarily referred to the health department but which have no real public health significance.

A division of mosquito eradication properly belongs in this bureau and the extent of the operations needed to suppress mosquito breeding has already been studied and a plan presented to the mayor and health department.

ALLIED HEALTH AGENCIES.

In order to systematically develop and expand health activities along all possible lines, and to centralize authority and supervision over all activities pertaining to the preservation and promotion of the public health, the support and full cooperation of all the so-called allied health agencies should be obtained. Reference is made to the associated charities, the Public Health Nursing Association, the Shelby County Tuberculosis Association, and any private or philanthropic organization whose resources may properly be expended in health work. Independent and uncoordinated effort on the part of such agencies will only interfere with the plans adopted by the health department. Properly supervised and correlated with the general health program formulated by the director of health, these various allied agencies will serve a most useful purpose and make possible a legitimate extension of health activities in general.

APPENDIX A.

ABSTRACT OF POWERS AND DUTIES OF TENNESSEE STATE BOARD OF HEALTH CONFERRED BY LEGISLATIVE ACTS.

[From Annotated Code of Tennessee, vol. 1, 1917, title 13, ch. 1.]

The State board of health is empowered to adopt rules and regulations and to have general supervision over the interests of the health and life of the citizens of the State; to study vital statistics of the State and endeavor to make intelligent and profitable use of records of sickness and death; to make sanitary investigations and inquiries respecting causes of disease, especially epidemics, the causes of deaths and the effects of employment, habits, localities, and circumstances upon the health of the people; to advise when necessary in reference to location of water supply, drainage and ventilation of public institutions, and to recommend works upon the subject of hygiene for the use of schools of the State.

The State board of health is also empowered to declare quarantine whenever the welfare of the public requires it, prescribe such rules and regulations as they may deem proper for the prevention of the introduction of yellow fever, cholera, and other epidemic diseases into the State, prepare and carry into effect such rules and regulations as will, in their judgment, with the least inconvenience to commerce and travel, prevent the spread of such diseases.

Violation by any person or willful disregard or evasion of quarantine or of any rules or regulations is made a misdemeanor, punishable, upon conviction, by a fine of not less than $500 or imprisonment in a county jail for a period of three months, one or both at the discretion of the court.

The acts of 1905, chapter 519, an act to prevent the introduction and spread of communicable diseases in the State, provided that physicians and others shall report to local health authorities all known or suspected cases of "smallpox, yellow fever, cholera, bubonic plague, typhus fever, diphtheria, membranous croup, scarlet fever, or other communicable diseases" except "and venereal disease, such as gonorrhea or syphilis."

It was made the duty of local health authorities to carry out, immediately upon the receipt by them of any notice of the existence of any of the above diseases, such rules and regulations as are prescribed by the State board of health; to inspect the house or locality where any of these diseases exist, isolating or quarantining infected persons or contacts when necessary; to placard the specific diseases mentioned and to employ the necessary quarantine guards to prevent the spread of the above-mentioned diseases.

The local health authorities are required by State law to provide food, fuel, medicine, nursing care, and other necessities for persons quarantined, these expenses to be paid by the persons so quarantined unless indigent.

Physicians in attendance upon cases of communicable diseases are required to notify the proper health authorities when premises are ready for disinfection.

Local health authorities are authorized to adopt measures for vaccination, and when necessary to vaccinate, to prevent the introduction or spread of smallpox. A penalty is provided for refusing or preventing vaccination and for false certification.

The board of education is required to exclude from school any pupil from a house where smallpox or any other communicable disease occurs.

Local health authorities are required to immediately notify the State board of health of the existence of any communicable disease in their respective jurisdictions, and in addition to submit on the first of each month a written report of all communicable diseases occurring during the preceding month.

Any person who willfully neglects or refuses to comply with any of the above provisions is guilty of a misdemeanor and subject to a prescribed fine or imprisonment.

Any person who has reason to believe himself affected with any communicable disease and who voluntarily goes upon any public street or place where people are accustomed to assemble, or enters any public conveyance or aids or assists anyone to so do, is guilty of a misdemeanor and subject to fine or imprisonment.

When any local "board of health" willfully neglects or refuses to comply with the provisions of this act in the face of actual or threatened epidemic, the State board of health is required to carry out the necessary provisions, the expenses to be borne by the respective municipality or county.

RULES AND REGULATIONS, STATE BOARD OF HEALTH, FOR THE CONTROL OF VENEREAL DISEASES, ADOPTED JUNE 23, 1919.

In accordance with these rules and regulations, syphilis, chancroid, and gonococcus infections are declared notifiable diseases.

Physicians, superintendents of hospitals and dispensaries, and others who may treat these infections are required to report to local health officers each case so treated, the reports to be held confidential.

When a case is reported by number only, the physician is held responsible for the observance of all rules and precautionary measures that shall be taken by the patient until said patient is cured or noninfective, which condition is to be reported to the local authorities. When there is sufficient evidence that the necessary precautions are not being taken, the name and address of the patient must be reported.

Provision is made for notification of any changes in physician or advisor employed by any patient, and when a patient fails to return for further treatment within seven days and no notice of change in physicians is received within said

seven days, it is the duty of the physician previously consulted to report the name and address of any such patient.

It is the duty of every physician who treats a case of venereal disease to give each person so treated a circular of information and advice concerning these infections.

Parents or guardians of minors who may acquire venereal diseases are held responsible for their compliance with these regulations.

It is further provided that, whenever a prostitute is found infected with venereal disease, the premises shall be placarded unless such prostitute be removed to a hospital or other place where isolation and proper treatment can be carried out, and no infected prostitute is permitted to move from one health jurisdiction to another without first securing a removal permit from the local health officer in the first instance and an acceptance permit from the health officer at the place of contemplated residence.

The period of infectiousness shall be controlled by the local health authorities and persons affected with infectious venereal diseases shall not engage in any capacity in which their infection is likely to be borne to others.

No penalty is prescribed or punishment provided for any violation of these regulations.

Powers and Duties of Original Board of Health, City of Memphis, as Authorized by Taxing District Act of 1879.

Under this act, the local Government was empowered to regulate, control, and suppress disorderly houses and houses of ill fame; to pass all laws to preserve the health of the city; to define, prevent, and remove nuisances within the city and for a distance of 1 mile outside the same; to make quarantine laws and enforce the same within 10 miles of the city, to prevent the introduction of contagious diseases into the city (1893); to establish and regulate hospitals in accordance with the present laws of the State (1873); to compel owners, tenants, or occupants of improved property to construct water closets and other sanitary appliances and connect same with water and sewer mains; to condemn as nuisances all buildings, cisterns, wells, privies, and other erections in the city which shall be found to be unhealthy (unsanitary or dangerous to persons or property) and cause same to be abated unless reconstructed at owner's expense; to provide that the city be kept in a "clean and healthy condition," each occupant to provide a suitable vessel for the storage of all refuse, which shall be removed by the public carts; to regulate wells and cisterns; to build, own, and maintain waterworks (1887); to regulate market houses and the sale of fresh meat, whether on foot or killed, and to appoint a meat inspector.

The local legislative council was empowered to issue bonds in order to build, purchase, or acquire control of a system of waterworks, and to compel owners and occupants of houses to take and use the water furnished; to levy a special sewer tax; and to levy a tax for the purpose of establishing a hospital for the treatment of communicable diseases.

Powers and Duties of Original Board of Health, City of Memphis, as Prescribed by City Ordinances Prior to 1909.

HEALTH OFFICER.

The health officer was required to carry out all the orders of the board and the laws of the State and ordinances of the city in relation to sanitary regulations; to make a thorough and systematic examination of the city and cause all nuisances to be abated.

He was permitted at all times "from the rising to the setting of the sun" to enter any place for investigation; to cause all stagnant waters to be drained, all privies to be cleansed and kept in good condition, and all dead animals or other noxious or unwholesome substances to be buried or removed beyond the city limits.

To carry out the foregoing, the health officer was directed to serve a written notice upon the owner, occupant, or agent, requiring the same to abate nuisances. Failure to comply was made punishable by fine for each violation, and the nuisance could be abated by the health officer and the cost recovered from the owner.

It was also the duty of the health officer to "visit and examine all sick persons" reported to him as "laboring, or supposed to be laboring, under any yellow or ship fever, smallpox, cholera, or any infectious or pestilential disease;" to cause such infected person to be removed to the "cholera, smallpox, or other hospitals, or to such other safe and proper place as he may direct," not exceeding 4 miles from the city, and cause them to be provided with suitable nurses and medical attendance "at their own expense," if able to pay; if not, at the expense of the county.

When directed by the president of the board, it was the duty of the health officer to cause a printed or written notice to be placed upon or near any house in which a person may be affected with smallpox. Defacing, altering, or mutilating any such notice is subject to fine.

The health officer was empowered to call upon the chief of police, who was required to furnish assistants, when necessary, to make a thorough and systematic examination of the city to ascertain all violations of the ordinances.

All terms and words used in the ordinances are specifically defined.

GENERAL HEALTH ORDINANCES.

The manufacture and sale of "poisonous, unwholesome, deleterious, or adulterated drugs, medicines, or foods" is prohibited.

It is required that all buildings or structures shall have adequate ventilation, light, and sewerage, and if condemned by the board of health as a nuisance the owner shall be notified to have the same reconstructed or removed.

All cisterns or wells found in an unhealthy condition must be rendered healthy or closed up, and the same are to be inspected by direction of the board of health at least once every three months.

Insanitary buildings or rooms shall not be rented for occupancy, and tenement, lodging, and boarding houses, theaters, and manufactories shall not be overcrowded, the same to be provided with adequate "privies or water-closets," which shall be kept in a "cleanly and wholesome condition" so as not to be "dangerous or detrimental to life and health."

Pure-food regulations are embodied in these ordinances, making it unlawful for any person or corporation to "manufacture for sale, produce, offer, expose, have in their possession, charge, or control for sale" within the city limits or 1 mile beyond, any adulterated, misbranded, below standard, or unwholesome article of food.

The board of health is empowered to adopt rules and regulations governing minimum standards for all classes of foodstuffs. The various terms are specifically defined and certain exceptions noted.

No foodstuffs shall be exposed to the dust or dirt of the street "unless perfectly protected by a suitable covering" authorized by the board of health.

A "permit" from the board of health is required for the manufacture or sale of any "food, drink, confectionery, or other condiments," whether single, mixed, or compound.

The use of milk or milk products obtained from cows found to be affected with tuberculosis is prohibited.

All meat intended for human consumption shall be inspected and stamped "Inspected" either by the board of health or the United States Bureau of Animal Industry.

Unwholesome or adulterated milk shall not be sold, and the conditions of unwholesomeness and adulterations are specifically defined.

The provisions of this ordinance are to be carried out by the "two meat inspectors, the two milk inspectors, and the food inspector of the board of health under the supervision of the city chemist."

Penalties for violations of the ordinance are provided.

SANITARY REGULATIONS.

Provisions are made to safeguard against the pollution of any public reservoir or any water used or destined to be used as a drink.

No domestic animal is permitted to run at large in any street or public place and no cattle, swine, sheep, goats, horses, or mules yarded within or adjacent to the built-up portions of the city without a permit of the board of health.

The slaughtering of cattle is regulated and a permit for the same required.

Any person selling or keeping for sale any fish, meats, poultry, or vegetables is prohibited from occupying or encroaching upon any portion of any street, sidewalk, or public place.

Every animal that is mad or has hydrophobia or shows symptoms thereof shall be immediately killed, and animals exposed to such infections shall be confined and observed for symptoms.

No business of tanning, skinning, scouring, or dressing of hides or leather is permitted (hereafter) without a permit of the board of health.

Stable manure is to be removed "at once" to "some proper place," and all stables, stalls, etc., shall at all times be kept in a cleanly and wholesome condition.

No person is permitted to leave in or throw into any street, place, or public water nor offensively expose or bury the body (or any part thereof) of any dead, fatally sick, or injured animal.

DISPOSAL OF SEWAGE AND OTHER WASTES.

Water-closets are not permitted to be constructed and connected with any sewer or underground passage unless provided with adequate vent for gases, etc.

All water-closets, privies, and urinals in residences shall be placed in a room not less than 5 feet in diameter, having at least one window with movable upper and lower glass sash. Adequate ventilation is required and such rooms shall not communicate directly by means of any door or opening with any sleeping or living room.

Privies and cesspools.—It is unlawful for any privy, sink, cistern, cesspool (1879), or well (1896) to be "made or rebuilt" in the city except in accordance with the regulations and pursuant to a permit from the board of health or for any privy to be built within 4 feet of the line of any lot.

An ordinance passed in 1880 provides for the appointment by the council and board of health of a "board of inspectors of vaults" who shall inspect every privy vault and water-closet, and when these shall be found in an unsanitary condition, the inspector is required to condemn the same as a nuisance and notify the owner or occupant to clean out, disinfect, and fill up the same.

The digging of privy vaults is prohibited.

When privy vaults have been closed, it is required that a "water-tight box, with handles, holding from 3 pecks to a bushel" be provided and let in under the seat; or a bucket or tub as prescribed by the board of health, or a "cement platform, raised at the edges 6 inches above the earth and sloping toward the center," may be used, and "at least once a day" the excrement in the receptacle is required to be covered with dry earth or ashes, and once every two weeks, or oftener if necessary, all of the excrement carried off at the expense of the city and removed to such places as the board of health may designate (until connections with the sewers can be made).

All privies and receptacles for excrement are placed under the supervision of the board of health, and inspection of every privy is required once each month or oftener if necessary.

Night soil.—When privy vaults are filled it is required that the receptacles for night soil be removed at the expense of the city until sewer connections can be made (1880). If the owner or occupant fails to abandon any privy vault when directed to do so it may be done by the board of health at the expense of the owner or occupant.

It is unlawful for night soil, manure, ashes, garbage, rubbish, or dirt to be flung or allowed to run or drop into or remain in any street or public place (1890), or for the contents of cesspools, privies, and vaults to become a nuisance or offensive (1897).

A permit from the board of health is required for the emptying of any vault, sink, privy, or cesspool in the city and said board is required to keep a record of all vaults, cesspools, etc., that are emptied.

The contents of privies, vaults, sinks, and cesspools may not be transported through any street except in an air-tight apparatus and under a permit from the board of health and all scavengers of manure, swill, ashes, offal, rubbish, or garbage are required to obtain such a permit.

The contents of sinks, privies, vaults, and cesspools are required to be disinfected and rendered inoffensive by the owner or occupant before their removal or exposure.

Garbage and refuse.—Every owner, tenant, lessee, or occupant of any and every building or place of business "in unsewered portions of the city" is required to provide at all times "suitable and sufficient boxes, barrels, or tubs" for receiving and holding without leakage and without being filled within 4 inches of the top thereof all ashes, rubbish, garbage, and liquid substances, the same to be kept in separate receptacles inside the property line and within 5 feet of a street, alley, or entrance, the public carts to remove and dispose only the kitchen and domestic household wastes, including ashes, all other refuse, including stable manure, to be removed by the owner or occupant.

COMMUNICABLE DISEASES.

Every physician is required to report immediately to the board of health "in person or in writing" any person he may attend or be called to see (within the city limits or 1 mile outside) who is sick with or whom he has reason to suspect has either of the following-named contagious diseases: Cholera, smallpox, yellow fever, scarlet fever, diphtheria, pseudomembranous croup (varicella), or chicken pox, typhoid fever, and tuberculosis, giving name, color, age, and place of residence.

In the absence of a physician, the parent, guardian, employer, or head of the household is required to make the report.

The death or convalescence of any such sick person is also required to be reported to the board of health immediately by the attending physician or by the person first making the report, giving the cause of death, at which time the health officer will remove the placard and fumigate or disinfect the house or room with contents (1887).

All persons knowing of cases of any contagious disease are required to report the same to the board of health.

Chief officers and physicians on vessels and railroads are required to report any cases of sickness or infected articles occurring thereon, and keepers of boarding and lodging houses are required to report in writing within six hours any sick person admitted from any vessel or railroad. No infected person or thing may be removed from any vessel and no person or thing from any infected place or land may be brought into the city without a permit from the board of health.

No person sick with a contagious disease may be removed from one building to another within the city without a permit from the board of health.

Smallpox.—The parent, guardian, or custodian of every minor child or other person is required to have the same promptly, frequently, and effectively vaccinated so that they may not take or be liable to take smallpox, and no child is allowed to enter any school unless successfully vaccinated or unless a certificate from a good physician is presented stating that vaccination has been tried and failed (1882).

MARRIAGES, BIRTHS, AND DEATHS.

All marriages are required to be reported in writing to the board of health by the clergyman, magistrate, or other person performing the ceremony.

Every birth is required to be reported in writing over the signature of the attending physician, midwife, or other person assisting at any birth, giving the address, sex, and color, and within five days from any such birth.

Every physician or professional adviser who attends any person at a last illness or has been present by request at the death of any person, is required to submit a written report, giving the facts in each case.

No interment of the dead may be made and no undertaker or other person may assist in or allow any such interment without a permit, and all sextons and undertakers are required to register and all undertakers are required to report once each week to the board of health all bodies or persons buried or transported since the last report.

The disinterment of dead bodies is forbidden without special permission from the mayor, nor may the same be removed until 15 months after interment or when the thermometer is over 32° F. (1879).

MISDEMEANORS.

The following acts are declared misdemeanors and made punishable by fines:

To uncover sewers or make connections therewith without permission of the city engineer.

Failure of the owner or occupant of any building used for any purpose to provide at least one water-closet, connected with the public sewer, within 15 days after notification by the city engineer or mayor.

Failure to provide a suitable sink, slop stone, or hopper for the reception of waste water unless the water-closet is suited for such purposes.

To throw filthy substances on the ground.

To allow surface or rain water to enter sewers except in accordance with regulations of the city engineer.

To deposit garbage or other refuse in any sewer or connections thereto.

To use any soil pipe or sewer extension that does not extend at least 6 inches above the eaves or well.

To use improper traps or improperly ventilated water-closets.

To spit upon any sidewalk or walks in any public square or upon the floor or platform of any street car or upon the platforms of railroad stations or the floors of any railroad passenger stations within the city limits.

Every member of the "sanitary or police force" is required to report to the board of health all water-closets, slop sinks, or other appliances not complying with city ordinances, and after an inspection the said board is required to serve a written notice upon the owner or occupant specifying the action to be taken, and the owner or occupant is required to remedy the conditions specified within five days, failure to do so being declared a misdemeanor.

CITY HEALTH ORDINANCES, 1910–1919.

1910.—To provide trustees for the hospital of communicable diseases and to prescribe their duties.

To provide for the appointment of trustees of the tuberculosis hospital and to prescribe their duties.

To prevent the spread of infectious, communicable, and contagious diseases among school children: No child may attend any school while suffering from or having been recently in contact with yellow fever, scarlet fever, smallpox, chicken pox, diphtheria, whooping cough, measles, or any other communicable disease. The board of health is authorized to have inspections made of all school children by competent assistant physicians.

To regulate the practice of midwifery as a profession: No person is permitted to practice midwifery until after passing a suitable examination and complying with other requirements, an application to be made to the superintendent of health, said application to be signed by three reputable citizens certifying as to good character. Each applicant is required to exhibit sufficient knowledge of her trade and to present the outfit used in practice. A permit for a period of one year is provided at a fee of $5. Midwives are required to report to the superintendent of health all births in which they in any way assisted. Failure to comply with all requirements is a misdemeanor punishable by fines.

To require every undertaker to report to the board of health twice each week all bodies and persons received, buried, transported, or otherwise treated.

To provide a building regulation.

To provide for a board of trustees for public baths for white and colored people.

To provide for a board of trustees for visiting nurses.

1911.—To amend an ordinance providing for the reporting of communicable diseases. Physicians are required to immediately report to the board of health "in person or in writing" all cases of the following diseases: Cholera, smallpox, yellow fever, scarlet fever, diphtheria, pseudomembranous croup, varicella or chicken pox, typhoid fever, tuberculosis, measles and other communicable diseases, cerebrospinal meningitis (1911), infantile paralysis (1912), malaria (1917), syphilis (1918), gonococcus infection (1918), chancroid (1918).

It is made the duty of the health officer or sanitary police to placard the house or residence wherein such a disease is reported to exist. Deaths are also required to be reported to the board of health by the attending physician or person first making the report.

To establish a board of hospital trustees for the government and control of the Memphis City Hospital, to prescribe their duties and define their powers, terms, and compensation. (Repealed once and repassed 1912.)

1912.—To provide for additional inspection of meats, meat products, and live stock: It is unlawful for any person to sell or offer for sale any meats or meat products unless the same shall bear the stamp or tag of inspection made by the Bureau of Animal Industry, United States Department of Agriculture, or by the city health department. Provision is made for the appointment of meat inspectors and for certain fees to be collected by them.

To require the use of metal cans with metal covers as receptacles for garbage and to further provide that said cans be kept covered.

To require all persons, firms, or corporations to report to the superintendent of the health department within 24 hours any sale or gift of diphtheria antitoxin, Flexner's serum, antityphoid vaccine, or any other vaccine or serum that may hereafter be used in the treatment or prevention of transmissible diseases.

To regulate the screening of dwelling houses to prevent the entrance of mosquitoes and flies.

1913.—To regulate the method of selling fruits, berries, vegetables, and other garden products.

To regulate and prescribe the method of selling milk, cream, or buttermilk in quantities of less than 1 gallon.

1914.—To further regulate and control the operation of street railway cars for the comfort and safety of passengers.

1915.—To amend an ordinance to regulate the handling and sale of milk within the city of Memphis, passed August 19, 1910, so as to provide for the testing of cattle: The tuberculin test is required for all cattle in herds used in the production of milk for sale within the city of Memphis, the test to be performed at least once each year by a regular licensed graduate veterinarian approved and registered with the health department.

To regulate barbering and to prescribe regulations for sanitary conditions and operation of shops.

1916.—To regulate the screening of dwelling houses to prevent the entrance of mosquitoes and flies: Effective screening with 16-mesh screens required from April 1 to November 1 for all dwellings.

To prohibit the sale or offering for sale of any fruits, candies, nuts, peanuts, popcorn, wienerwursts, tamales, sandwiches, ice cream, soda water, soda pop, coca-cola, or any like or similar articles of food or drink upon the streets, alleys, or sidewalks without written permission from the chief of police.

1917.—Making it unlawful hereafter to construct any hospital for the sick or infirm within a radius of 1,000 feet of any school building.

For the prevention of vice or prostitution in hotels and public inns.

Requiring all persons engaged in the production or handling of milk for sale in the city of Memphis to be vaccinated with typhoid vaccines and to have certificates of such vaccination available for inspection.

Providing that all cases of malaria and all cases in which malaria is a contributory cause shall be reported to the department of health.

1918.—To regulate the handling and sale of food commodities and their conservation.

To prevent the spread of venereal diseases.

To better protect the public health and particularly to further prevent the introduction of venereal diseases into and the spread thereof in the city of Memphis; to define venereal diseases; to provide for the examination of suspected and reported cases and the isolation, care, and cure of persons infected

with such diseases under the authority and direction of the health department; and to provide penalties for the violation of this ordinance.

RULES FOR THE ENFORCEMENT OF PURE FOOD ORDINANCE, 1918.

The enforcement of the rules adopted for the enforcement of the pure food ordinance is made the duty of the city health department through its chemist.

Food inspectors and health officers are required to (1) collect samples of food for examination and analysis; (2) to inspect dairies and other places where milk products are handled; stockyards, abattoirs, and slaughterhouses; canning factories, confectioneries, bottling works, and other places where food is made or prepared; grocery stores, food markets, drug stores, bakeries, restaurants, hotels, and other places where food is prepared or sold.

Samples shall be seized in the presence of the dealer in triplicate, sealed and numbered, the quantity to be not less than 6 ounces or 1 pint, duplicate sealed samples to be left with the dealer if he so requests. Each sample is to be given a serial number, to be noted in the inspector's blanks.

The methods of analysis shall be those prescribed by the Association of Official Agricultural Chemists and the United States Pharmacopœia.

Whenever any dairy, slaughterhouse, bakery, or other establishment is found unclean or conducted in an insanitary manner, the inspector shall report his findings to the city chemist and also to the owner or operator of such establishment to make the necessary changes within a specified time. When so notified the owner or agent may make a written plea to the Secretary of the board of health within five days from the date of the notice asking for a hearing to give reasons why the conditions existed and why he should not comply with the order.

The mixing of substances with any food product that will lower or reduce its strength is prohibited. Adulterations by the addition of preservatives is prohibited. The use of dyes or coloring matter for the purpose of making a product appear better or of greater value is prohibited.

Raw material used in manufacture of food and drug products shall be sound, wholesome, and free from decomposition.

Misbranding or the use of false or misleading statements or devices is unlawful, and labels shall contain the words required by the food and drug act of June 30, 1906.

The construction, sanitary condition, and operation of bakeries, abattoirs, and slaughterhouses, groceries, and meat markets, drug stores, and hotels and restaurants are specifically covered in the rules adopted, and while brief and not particularly detailed, the more important conditions are noted.

REVISED MILK ORDINANCE, INCLUDING AMENDMENTS PASSED TO 1918.

An ordinance to regulate the handling and sale of milk within the city of Memphis, in force July 10, 1917.

A permit from the health department is required for the production for sale or distribution of milk, cream, or buttermilk within the city of Memphis, the application for such permit to be made in writing, and when granted are to be issued for a period of one year. Certain pertinent information is required to be included in the applications.

No permit will be issued if the records of the city health department show that the dairy, milk depot, or store in which the milk or milk product is handled, prepared, or stored is in an insanitary condition or is being operated in violation of city ordinances. If the applicant's record is not on file, an

inspection must be made of the place of business to determine the suitableness of the location, condition of equipment, sanitary condition, and methods before a permit is issued.

Any permit so issued may be revoked at any time if the holder of such permit fails to comply with the requirements of the health department, and the defendant may be granted a hearing. After such revocation the permit may be reissued if the defendant complies with all requirements and manifests his intention to meet them in the future. Permits shall be posted in a conspicuous place.

It is made the duty of the health department to publish monthly in the daily newspapers of the city the names, scores, and other data of dealers in order to inform the consumers of the relative status of all dealers.

Violation of any provision of this ordinance is made a misdemeanor, punishable by a fine of not less than $5 or more than $50 for each offense, three violations within one year revoking any permit for a period of one full year from date of last violation.

The issuance of a permit is dependent upon compliance with the following rules and regulations:

Tuberculin test.—All cattle in herds used in the production of milk, cream, or buttermilk for sale within the city of Memphis must be tested with tuberculin at least once in every 12 months, the test to be made by a licensed graduate veterinarian, appointed by and registered with the health department, and the owner required to pay a fee of 50 cents per head to the health department. All animals testing healthy shall bear an official tag and a statement filed by the official veterinarian for each animal tested. All reacting cattle shall be branded with the letter "T" on the right hip and immediately isolated and the entire premises thoroughly disinfected. Animals purchased from adjoining States are to be tuberculin-tested cattle and properly tagged.

Milk depots.—A milk depot is defined as any place, house, or room where milk is received from dairies, including all ice-cream factories, and is prepared for distribution. No milk depot shall communicate directly with any living rooms, toilet, or stable where animals are kept or slaughtered, and no accumulation of rubbish, garbage, manure, or other putrefying, infectious, or bad-smelling substance shall be allowed to accumulate within 50 feet thereof. Privies shall not be located within 100 feet from cow stables and milk rooms, and shall be properly protected from flies and mosquitoes.

Dairies.—A dairy is defined as any place where cattle are kept for the production of milk. No such dairy shall be established in unsanitary surroundings, which are held to include improperly constructed barns, milk rooms, and utensils; dirty, unhealthy cattle, which may be crowded or fed distillery waste or other food forbidden by the ordinances; unclean utensils or premises; milking without first washing and drying the udders of all cows and where attendants do not wash and put on clean outer garments prior to milking; where milk is not removed from the barn to the milk room immediately after milking each cow and at once properly cooled; milk rooms and stables without impervious floors and screens are not provided; and wherever the owner refuses an inspection of his premises or to cooperate with officers of the health department.

Floors in dairies, stables, milk rooms, and milk depots are required to be smooth, free from crevices and water-tight, and of impervious construction, well-drained and ventilated. The walls, stanchions, and partitions, round-bottomed metal-fed troughs, glass windows giving 4 square feet of glass per cow, the King or muslin system of ventilation, are all required. No side sheds may be attached, and all manure must be removed at least twice daily to a pit or field

at least 200 feet from the stable. Six hundred cubic feet of air space is required for each cow stabled.

The milk room shall be provided with proper light, cooling tanks, smooth tight walls and ceiling, screened between April 1 and November 1, and adequately ventilated.

A separate wash room is required where cans, bottles, and other utensils are to be cleaned and washed, dirty cans and utensils not to be taken into or kept in the milk room.

Cooling vats to be of impervious material, provided with dust-proof covers and properly drained, the water in the vats to be kept clean, sweet, and free from sediment or odor and at a temperature not above 50° F. Refrigerators and ice boxes to be metal or porcelain lined, and the milk compartment to be clean and free from odor, nothing but milk products to be stored therein.

Bottling machines to be so constructed as to be readily taken apart and cleaned and to be thoroughly cleansed daily. Drying racks to be provided on which bottles and cans can be placed inverted for drying.

Pasteurizers and separators to be constructed so that all parts may be readily cleansed and sterilized.

Water used in dairies or milk depots to be submitted to the city chemist for analysis whenever he so requests. Each dairy to have an adequate supply of pure fresh water.

All utensils, including shipping cans, bottles, dippers, measures, strainers, etc., to be free from spaces where milk may accumulate, with smooth surfaces and free from rust and at all times to be kept scrupulously clean and in good repair. Milk stored in rusty or unsuitable containers to be condemned and destroyed by the inspector as being unfit for human consumption.

Floors, walls, ceilings, and all other surfaces to be kept clean and free from dust, dry sweeping and dusting being prohibited.

Attendants to keep themselves clean and cleanly clothed while engaged in milking or handling milk. Smoking, snuffing, or chewing tobacco is forbidden while handling milk, notices to this effect to be posted by owners in each dairy or milk depot.

No person suffering from tuberculosis, venereal disease, or other communicable disease is permitted to work in any dairy or other place where milk or its products are handled. When typhoid fever, scarlet fever, diphtheria, smallpox, measles, or chicken pox occurs in the house or family of any person employed in the handling of milk, it is the duty of the owner or manager to notify the superintendent of health immediately of the fact. No person convalescent from any communicable disease is permitted to engage in the handling of milk or enter any dairy or milk depot. When any communicable disease exists as above noted the dairy, depot, or wagon shall be declared infected, together with all milk, cream, or buttermilk with which such person may have come in contact. No person convalescent from any communicable disease or who has lived in any house where such disease exists shall reengage in the handling of milk unless the health department has enforced suitable quarantine regulations and the necessary disinfection.

The removal of any bottle or other receptacle used for containing or storing milk from any dwelling wherein exists a case of communicable disease is prohibited except with the permission of the health department and after thorough disinfection.

All milk must be stored at a temperature not above 50° F., no can or bottle of milk to be completely submerged in impure water and no impure ice to come in contact with milk and milk utensils or to be used in cooling vats. Returned

empty bottles and other utensils to be thoroughly cleaned and sterilized before being conveyed into the milk room.

Milk must be transported in closed receptacles and in covered wagons, properly protected from dust and sun's rays, all wagons to be kept clean and compartments where milk is kept shall be tight and opened only when necessary for its removal.

Bottling or transferring milk from one receptacle to another upon any delivery wagon or except at the dairy or milk house is prohibited.

All milk, skim milk, cream or buttermilk in quantities less than 1 gallon shall be sold in the original and unbroken packages in which it was purchased.

Milk for delivery to the consumer shall not be above 60° F.

No receptacle used as a container for any dairy product shall be used for any other purpose.

No dairy product shall be allowed to remain at any railway station, depot, or platform longer than 1 hour from its time of arrival.

No milk ticket, except metal checks, shall be used more than once.

All milk products intended for delivery or shipment into Memphis shall be shipped in a can or receptacle bearing a tag or stamp showing name of shipper and of consignee and quantity and kind thereof, and the same shall be sealed at point of shipment with wire seal which shall not be broken until received by consignee except for the inspection of an agent of the health department. No milk or its products shall be shipped into or offered for sale in Memphis from any dairy, dealer, factory or other place upon or in the vicinity of the premises from which it is shipped where exists any dangerous or insanitary condition not hereinbefore specified which in the opinion of the health department may cause or make possible the contamination of said milk product.

Grades of milk allowed.—Only the following grades of milk shall be allowed in the city of Memphis:

1. "Certified" milk or milk that is produced and handled under the supervision of the Shelby County Certified Milk Commission.

2. Grade A, raw and pasteurized: To be clarified and to contain not more than 100,000 bacteria per cubic centimeter at time of delivery to consumer. Before pasteurization such milk shall at no time contain more than 1,000,000 bacteria per cubic centimeter. The dairy producing milk for pasteurization shall maintain a sanitary score of at least 70. All dairies or creameries offering grade A raw, shall use steam in the sterilization of all milk utensils and maintain a sanitary score of at least 90.

3. Grade B, raw and pasteurized: Raw milk of this grade, shall contain not more than 500,000 bacteria per cubic centimeter; before pasteurization not more than 5,000,000 bacteria per cubic centimeter, and after pasteurization not more than 200,000 bacteria per cubic centimeter at time of delivery. The sanitary score of all dairies or creameries offering this grade for sale shall be at least 70.

Requirements for grade A milk.—Application to produce this grade shall be made in writing to the health department. Milk so graded shall be held in containers bearing a cap, label, or tag designating the grade and whether raw or pasteurized. All sanitary scores shall be made in accordance with a scoring system adopted by the health department.

Milk for this grade must be clarified by means of an efficient centrifugal clarifier. Only a clean soda solution for the washing of milk utensils is permitted and thoroughly cleaned utensils shall be sterilized effectively with live steam.

The "holding" method of pasteurization is required, the milk, skimmed milk, or cream to be uniformly heated to a temperature of 143° to 145° F. and

held between these limits for at least 30 minutes, and then cooled at once to a temperature of 45° F. or less. An accurate temperature recording apparatus is required, the records of this apparatus to be accurate and made on a daily chart which shall be dated and preserved for the inspection of the agent of the health department. An automatic thermoregulator and recorder may be combined in one instrument.

Pasteurized milk, skimmed milk, or cream shall be delivered to the consumer within 24 hours after pasteurization, and no such product shall be pasteurized the second time.

GUIDE FOR SANITARY SCORING.

NOTE.—Two-thirds credit is given for "methods" and one-third for A, B, and C. When the total of items under any of headings A, B, C, or D is below 60, zero is given for all items of that heading.

A. Stables (10 points per):
1. Well located, i. e., on high ground.
2. Well concreted throughout.
3. Well drained.
4. Well lighted and ventilated.
5. Provided with separate quarters for sick and calving cattle.
6. Walls and ceilings clean.
7. Floor cleaned immediately after each milking.
8. Manure removed to a distance of 100 feet at least.
9. Improved stanchions with rounded troughs of metal or concrete.
10. Stalls at least 3.5 feet wide and 10 feet high.

B. Milk and washrooms (10 points per):
1. Conveniently located to stables.
2. Free from flies.
3. Properly concreted.
4. Propery drained.
5. Properly screened from April 1 to November 1.
6. Walls and ceilings tight and smooth.
7. Walls and ceilings clean and free from posters, pictures, etc.
8. Benches or work tables clean and well lighted.
9. Floors properly kept.
10. Water pure, fresh, abundant in washroom.

C. Premises (20 points per):
1. Well drained.
2. Free from rubbish and animals.
3. Free from breeding places of flies and mosquitoes.
4. Privies at least 100 feet from milk house.
5. Privies protected from flies and mosquitoes April 1 to November 1.

D. Methods (10 points per):
1. Clean, separate clothing for milkers. Milkers' hands washed and kept dry.
2. Cows' bags and udders washed and dried; first milkings discarded.
3. Small top milk pails used. Milk at no time kept in stables.
4. Utensils properly washed, rinsed in boiling hot, clean water and drained. Utensils smooth and free from rust, open seams, etc.
5. Utensils sterilized with steam and protected from dust, etc. In lieu of steam, the use of the regulation sanitary paper container is credited.
6. Milk immediately cooled below 50° F.
7. Milk kept cooled below 50° F.

8. Milk delivered on ice.
9. Clarified.
10. Pasteurized.

For wholesalers whose milk is eventually clarified and pasteurized, the following (*a*) and (*b*) in place of 9 and 10, shall obtain: (*a*) Cans of milk reaching destination four hours from time of last milking; (*b*) cans of milk after leaving milk house protected from sun and dust.

Appendix B.

Malaria control measures.

Room 17, Courthouse,
Memphis, Tenn., April 2, 1920.

City Health Officer,
Memphis, Tenn.

Sir: There is submitted herewith for your information a brief outline of equipment, personnel and cost of malaria control measures inside the city of Memphis for the present season. This outline was prepared by Associate Sanitary Engineer W. G. Stromquist, who is familiar with local mosquito conditions and has been approved by Senior Sanitary Engineer J. A. Le Prince and myself.

It is urged that the city health authorities take such steps as may be necessary for carrying out the recommendations contained in Mr. Stromquist's memorandum as soon as practicable, since the mosquito season is almost upon us and the organization of a "mosquito squad" and the cleaning of drainage ditches might well begin at once.

You will please note that Mr. Stromquist recommends the employment of a field director—the greater part of whose salary shall be paid by the Public Health Service. If this recommendation meets your approval and proper arrangements can be made for coordinating the malaria work inside Memphis with the Shelby County work I stand ready to carry out this recommendation upon notice from you.

Respectfully,

L. D. Fricks,
Surgeon, Medical Officer in Charge.

Room 17, Courthouse,
Memphis, Tenn., March 31, 1920.

Surg. L. D. Fricks,
Malaria Investigation Division,
United States Public Health Service, Memphis, Tenn.

Sir: In regard to the organization of mosquito-eradication work in the city of Memphis for the season of 1920, the following recommendations are submitted:

That a foreman with 10 or 12 laborers be employed at the beginning of the season to do such ditching and clearing of old ditches and streams as may be necessary.

That two inspectors be employed to examine streams and other natural water surfaces for mosquito breeding and to direct the oiling work. These men must be reliable, industrious, active, and interested in the work.

That at least three men be employed to do the oiling. It may be found advantageous to have these men work together with a truck to keep them supplied with oil.

That a truck, of at least 1-ton capacity, be made available for the exclusive use of the mosquito-eradication forces during the mosquito season, and that a driver be employed for the truck.

That a Ford be made available for the use of the director in charge of the mosquito-control work.

That the inspection of rain-water barrels and other artificial containers be done by the sanitary inspectors, and this be made a part of their regular duties in inspection of premises.

That the possibility of using a cheaper grade of oil than black oil and kerosene, such as "gas oil," be investigated. It is believed that 5,000 gallons or more will be required during the season.

That a field director be employed to supervise the work and to coordinate the mosquito-control measures of the Memphis Health Department and those conducted by the board of health of Shelby County in the area contiguous to the city. This field director's salary shall be paid jointly by the health department of the city of Memphis and of Shelby County and also, if possible, by the United States Public Health Service. A recommendation giving details of this plan has been submitted to the health officers of the city and county.

The area to be controlled is about 21 square miles, with approximately 36 miles of streams and ditches.

A preliminary outline of the expenditure of the fund of $10,000 for malaria control by mosquito eradication is given below:

Drainage, including new ditching, clearing of old ditches and streams	$2,325
Oil inspectors	1,600
Oilers	1,675
Oil, 5,000 gallons, at 17 cents	850
Truck driver	700
Truck and Ford	1,600
Repairs and gasoline	525
Tools and supplies	250
Field director	475
Total	10,000

Respectfully,

W. G. Stromquist,
Associate Sanitary Engineer.

APPENDIX C.

PHOTOGRAPHS TAKEN IN MEMPHIS.

Fig. 1.—Yard closet near the Baptist Memorial Hospital. No running water. Hopper foul.

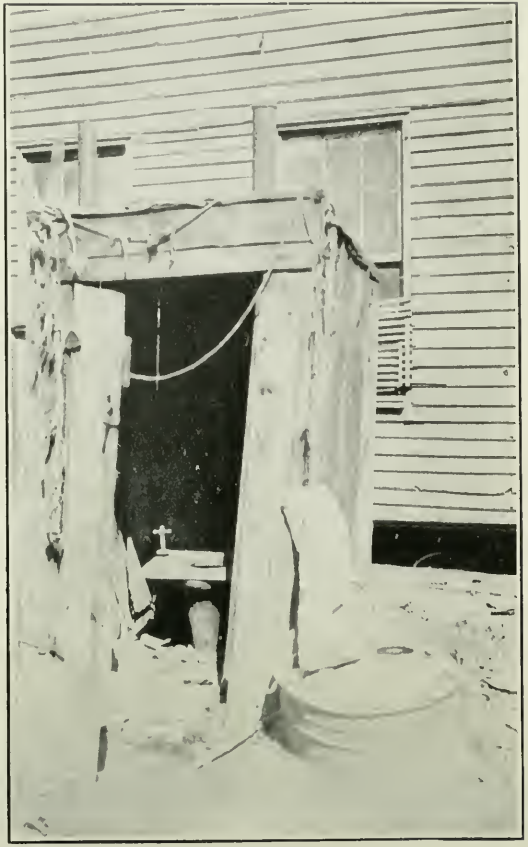


Fig. 2.—Type of "yard closet" found in Memphis. The hoppers are usually found freshly soiled with fecal matter. Superstructures are never fly-proof. They are found in practically every ward.

Fig. 3.—Yard closet at negro home, right in the "face and eyes" of the Bruce High School. There are several more in this location.

Fig. 4.—A battery of yard closets in front yards between two rows of negro houses near railroad station.

Fig. 5.—Alley with rows of insanitary privies. This alley was knee-deep with rubbish and filth of all kinds. Over 100 negro homes in this section.

Fig. 6.—Tank wagon used for collecting privy contents.

Fig. 7.—The usual type of insanitary privy—so-called "earth closet." Superstructures dilapidated, excreta freely exposed to flies, etc. Arrow points to leaking tub. These privies are a decided menace to health and pollute the private wells found in same neighborhood.

Fig. 8.—One of the "bayous," showing leaking sewer pipe. While this picture was being taken, kitchen garbage was thrown into the bayou from one of the porches.

Fig. 9.—No protection of food against dirt, dust, or promiscuous handling. Food not even raised above the sidewalk.

Fig. 10.—Communicable Disease Hospital. Maximum capacity 15 beds. Entirely inadequate.

Fig. 11.—Cow stable with cement floor and plenty of ventilation. Not fancy but found clean and in good condition. Said to be of average type. Some of the others seen were given a very low rating. Methods of handling milk are more important than equipment.

Fig. 12.—This structure is dignified by the name of "milk house." It contains a vat used for cooling milk in cans. Cooling and storage facilities are frequently crude and unsatisfactory.

Fig. 13.—Buildings such as these should be condemned and torn down. They are unfit for human habitation.

Fig. 14.—An "ark," housing many families, crowded, poorly ventilated, generally insanitary, and a nuisance; contributing to the excessive death rate among the negro population.

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